A TREATISE
ON
CITRUS CULTURE
IN
CALIFORNIA.

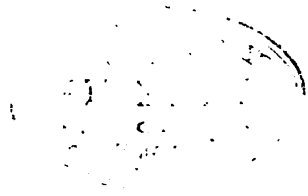
1888.

Compliments of

B. M. LELONG,

Secretary California State Board of Horticulture.

Please acknowledge receipt.



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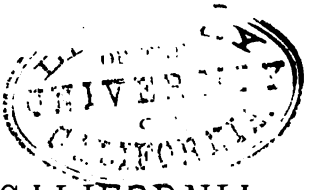
WASHINGTON NAVEL.

A TREATISE

ON



CITRUS CULTURE IN CALIFORNIA.

WITH

A Description of the Best Varieties grown in the State, and Varieties grown in other States and Foreign Countries; Gathering, Packing, Curing, Pruning, Budding, Diseases, Etc.

BY B. M. LELONG,
Secretary of the State Board of Horticulture of the State of California.

Know'st thou the land where the lemon trees bloom,
Where the gold orange glows in the deep thicket's gloom,
Where a wind ever soft from the blue heavens blows,
And the groves are of miro and nikau and rose? California.

SACRAMENTO:
STATE OFFICE, : : : : J. D. YOUNG, SUPT. STATE PRINTING.
1888.

To the honorable the Officers and the Members of the State Board of Horticulture:

GENTLEMEN: This little "Treatise" is by permission most respectfully submitted for your kind consideration and approval.

I have used every effort within my power to have the same in the hands of the Printer, but owing to the immense increase of business of this Department, to which I must devote the most of my time, and having had no assistance, it has been delayed until now.

The inquiry for information on this subject has by far exceeded my power to give by letter, and I sincerely hope that this little work will now supply the long felt want.

Very respectfully submitted.

B. M. LELONG,
Secretary.

Approved:

ELLWOOD COOPER,
President.

SAN FRANCISCO, April 9, 1888.

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INTRODUCTORY.

I desire to acknowledge my inability to do the subject of "Citrus Culture" full justice, owing to the very limited time at my command in its preparation; but enough is written, which is of practical experience, to aid those who are embarking in the business, and the many who have sought the information from this Department.

In the preparation of this little work I have been overcautious not to put into print too much reading matter, so that the reader will not have to spend hours in reading before he discovers what he desires to learn.

I have, since boyhood, exercised great love for the culture of citrus fruits, especially the Orange and the Lemon, having been brought up among them.

My father (a pioneer, and member of Colonel Stevenson's regiment) was among the first to propagate citrus trees in the early days of California history.

I have, ever since these events, when there were but few Citrus Orchards in the State, watched the progress Citrus Culture has made. Since then we have heard the doctrine of overproduction propounded, and as the years have slowly rolled by, the many thousands of acres of trees which have since then been planted have come into bearing, the demand increasing as fast as the production, and there is no industry in this State having a more promising future, and it is bound to become one of the greatest of all industries of our great State.

When we compare Citrus Culture in this State with other countries, with what they must do to raise a crop, the many diseases they have to contend against, and having all these

disadvantages they make Citrus Culture pay, then we look to California's immense capabilities, where the trees bear unprotected and without care the year round, where diseases among them are but little known, and how remunerative they are to the owner, then we glance back to those who have preached overproduction, who have spent their lives with their faces turned back, lamenting the good old days.

We may safely say that in this State Citrus Culture is yet in its infancy, and look hopefully to its promising future. Only in the past few years did we know what were the best varieties to grow, such as would be profitable, and would bear transportation, manner of packing, curing, etc., but through energy, persistency, and hard work we have accomplished that end, and to the world we have made known the quality of our fruits, which cannot be surpassed. The awarding of GOLD MEDALS to California at the "NEW ORLEANS WORLD'S FAIR" for the best twenty varieties against the *World*, is conclusive evidence of this fact.

MR. L. M. HOLT, of Riverside, in his essay on "The Future of Citrus Culture in California," read before the Ninth Fruit Growers' Convention, said:

The cultivation of the orange in favorable localities, is probably the most profitable business to which an acre of ground can be devoted for horticultural and agricultural purposes. It takes time to develop an orange grove, and this fact taken in connection with the fear of overproduction, keeps the masses from going into the industry, and hence, the time when overproduction will come, if ever, is pushed far into the future.

The question of raising a superior orange in California is now settled. This State not only raises a superior orange, an orange that is king among oranges, but that fact is recognized by the markets of the United States, and there is no probability that the present century will see enough oranges produced in California to supply the spring markets of the Atlantic States. The Mediterranean oranges are being practically driven from the market, while the Florida orange cuts no figure, as it is not a competitor. The California crop comes upon the market in the spring when the system demands an acid fruit, and at a time when there is practically no other fruit in the market with which it is brought into competition.

The time is coming when train loads of oranges from California will be shipped across the Rocky Mountains, where now only carloads are sent. It is only about three years since oranges were first successfully shipped from Southern California to Chicago. It was then an experiment; a market had to be made in the Western States. It took time to make it, and yet the market has extended more rapidly

than the bearing capacity of our orchards, and there has never been a time since the shipment of oranges on a large scale to the Western States commenced, when the demand for good oranges did not exceed the supply. And yet, the markets of the Northwest are only partially developed, and the East has not been touched at all.

DR. O. P. CHUBB, of Orange, who two years ago was sent to the Eastern States, by the Orange Growers' Protective Union, of Southern California, to establish agencies, in his essay on the "Future Markets for California Citrus Fruits," said:

The rapidity with which California citrus fruits have, within the past five years, gained a foothold in eastern markets has greatly surprised not only Florida growers, but importers from the Mediterranean. That oranges, lemons, and limes were produced on this coast, had, of course, long been known, but active competition in quantity throughout the States east of the Rockies was neither suspected nor feared.

Florida, however, cannot be materially affected by the increasing importance of our trade, since her output is nearly or quite consumed before ours is sufficiently mature to take its place. The only point of contest at issue between these two sister States in the citrus trade seems to be one of quality and beauty, or, in other words, a matter of "*points*," concerning which a committee expressed an opinion at New Orleans not long since. The Atlantic cities appreciate fine fruits, and in this respect there is an opening for our growers to meet Florida in her own chosen markets, and before her season closes. The lateness of California's main crop is her strong hold in those cities west of the Atlantic seaboard. This climatic advantage is an important one, and should be well considered in the selection of varieties for planting, since the later the shipments are made the better the prices obtained (at least, such has been the case in past seasons) up to the middle of July, when strawberries and other small summer fruits interfere. The great Northwest is, however, capable of absorbing our entire product at remunerative prices as early or late as it is in fair or fit condition to place. The States west of New York and Pennsylvania are depending more and more each year on California for spring shipments of oranges, and the heavier consumption is steadily pushing westward. The people there are all interested in California and her fruit products, and will choose her oranges in preference to Mediterranean fruit of like quality and price.

By intelligent propagation of imported varieties and stocks, aided by peculiar adaptation of climate, soil, and methods of cultivation, our horticulturists have developed new types of flavor, pulp, and peel, which western taste is not slow to recognize and appreciate. The Washington Navel stands to-day the peer of any orange known in the market, and is really the autocrat of the price list. Following this winner of gold medals and golden opinions come the luscious St. Michael, the sprightly Mediterranean Sweet, the handsome and characteristic Valencia, and late and various improved selections from the older orchards of seedlings, not to mention the average seedling, of a quality equal to anything grown on the coast or islands of the Mediterranean.

All these varieties, as the product of California soil and climate, possess that happy combination of sugar and acid, of flavor and aroma, which not only pleases the palate but corrects the bile of the eastern consumer as he emerges from the

ruins of a supertonic winter into the malarious tendencies of a radical spring warmth mixed with the vagaries of an obstinate liver.

And so he comes to recognize the California orange as not only the proper thing, but as coming in at the proper time, and he proceeds to put it where it will do the most good. It is a new and popular prescription from Nature's California laboratory, and he cries for it daily. The great and growing cities of the Mississippi Valley are learning to appreciate and consume increasing quantities of this class of fruits, filling the gap, as they do, between the ham fat of winter and the chicken broth and fresh vegetables of the heated term in July. This industry is yet in its infancy on this coast, and we may rest assured that the demand for choice fruit at high prices will always remain in advance of the supply.

Professor Van Deman, Chief of Pomological Division, United States Department of Agriculture, in a recent letter, said:

Having had frequent opportunities to test the oranges of every part of the United States, and those from Mexico, Jamaica, and the Mediterranean, I am glad to say that those of our own country are the best of those tested. We not only have imported the best varieties from nearly every part of the world, but our wide-awake fruit growers are producing new seedlings, some of which are equal to the best, and the tendency is constantly upwards.

PART I.

VARIETIES, PROPAGATION, PLANTING, DISEASES, ETC.

CITRUS AURANTIUM DULCIS.

CITRUS AURANTIUM NOBILIS.

CITRUS AURANTIUM BIGARADIUM.

CITRUS AURANTIUM BERGAMIUM.

CITRUS AURANTIUM DECUMANUM.

CITRUS AURANTIUM INDICUM LIMO-CITRATUM FOLIO, ET FRUCTU MIXTO.

ORANGE CULTURE.

What is most important to the beginner is what varieties to plant. I have arranged them into classes, Foreign varieties and Native varieties, by themselves, those that are recommended to be propagated in one class, and those not recommended under another. A short description is given to illustrate their qualities.

Also for the purpose of aiding those who may wish to experiment with varieties not yet introduced. A list of nearly every known variety is given, together with those that have already fruited in this State, with comments as to their value. The descriptions are short, but well serve the purpose.

THE ORANGE.

CHAPTER I.

BEST VARIETIES TO PLANT.

CLASS A.

The varieties classified under this head are of foreign origin; their prominence is about in the order named.

They are recommended as marketable and profitable varieties to grow.

WASHINGTON NAVEL. (Bahia, Riverside Navel.)

This orange is the most popular of all foreign varieties grown in this State. Fruit large, solid, and heavy (Plate 1); skin, smooth, and of a very fine texture; very juicy; high flavored with melting pulp; is nearly seedless, only in exceptional cases are seed found; tree is a good and prolific bearer, medium thorny, a rapid grower, although it does not attain a very large size; bears when very young, commencing to bear as early as one year old from the bud.

This variety was imported from Bahia, Brazil, in 1870, by

Mr. William Saunders, of the Department of Agriculture at Washington. There were twelve trees in this importation. It was sent out by the Department under the name of *Bahia*, but was changed to Washington Navel, to distinguish it from a variety introduced from Australia and grown to a limited extent in California.

Two of the first trees to bear, aside from the orange house of the Department, were at Riverside, and as the buds were taken from those trees it got the name of Riverside Navel.

The late Mr. Wells (Wells, Fargo & Co.) spent the winter of 1873–4 in San Diego, and in conversation with Alexander Craw, then foreman for J. M. Asher, nurseryman, San Diego, told him about the Bahia in glowing terms; Mr. Craw suggested that it would be a desirable variety to have in California. He said he would send for trees, and did so, but the trees above mentioned were the first to fruit.

This variety is claimed to be a shy bearer in *Florida* and other States, but in this State, after having fruited for several years, it has proved itself to be a prolific bearer, although oranges in common in this State will not bear large crops every year, every other year being an off year, more particularly so with seedlings, producing more fruit one year than another.

VALENCIA LATE. (Valencia August, Loretto, Rivers' Late.)

This variety has in the last six years fruited in this State, and is one of the best varieties grown. (Figure No. 1.) The fruit resembles the Paper Rind St. Michael in color and firmness, but oblong, and being larger in size. Trees of this variety do not commence to bear young; so much in its favor, as most of budded foreign varieties commence to bear when entirely too young, thus checking the growth of the tree. It is a very good keeper, and a prolific bearer.

Fruit ripens very late, when all others are out of market.

Through mistake, this variety was budded into several hundred trees in the orchard of Col. J. R. Dobbins, at San Gabriel. They were supposed to be the Navel. These buds were put into trees in a corner of the orchard, separate from the Wash-

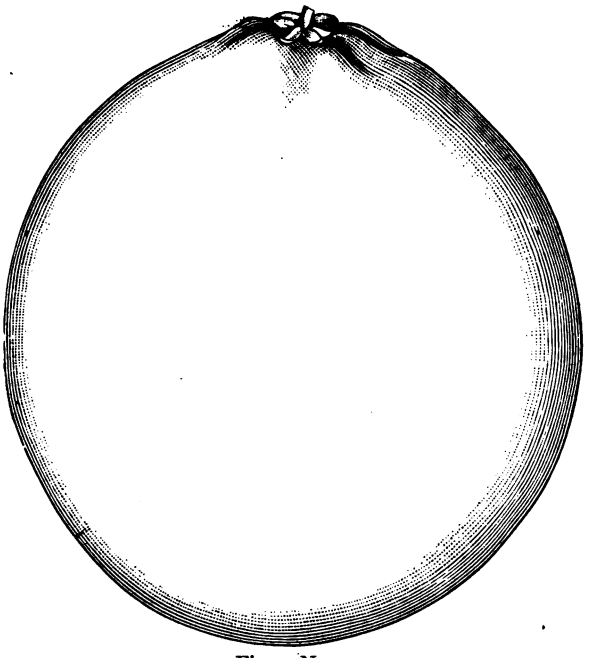

Figure No. 1.

ington Navels, that were budded at the same time. When the Navels began fruiting, these trees showed no signs of bearing whatever. The Navels fruited for three or four years before the *Valencia Late.*

Colonel Dobbins became discouraged with them and concluded to have them rebudded with Washington Navel. But that year the trees put forth full of bloom, the fruit set well, and after all others had been shipped, he turned his attention to this variety, which as yet was hardly ripe enough for shipment, and to his gratification proved to be one of the best varieties he had. The trees were double the size of the Washington Navel. For the last two seasons fruit has been sold at $4 per box, delivered at the station at San Gabriel.

About six years ago Mr. J. W. Wolfskill, of Los Angeles, had one tree of this variety in bearing for two seasons, and noticing its late and other good qualities, budded extensively into ten-year old bearing trees; and two years ago he received $6 50 per box in Chicago, in the month of June.

This was $2 per box more than the Palermo oranges brought in the same market at the same date. The agent reported, "No shrinkage and no decay." This variety should be extensively planted in this State.

MALTESE BLOOD. (Figure No. 2.)

This is a very popular variety. The fruit is small to medium, oval; has a fine texture and flavor. The pulp is marked, and seems to be streaked and mottled with blood; has few seeds; tree is thornless.

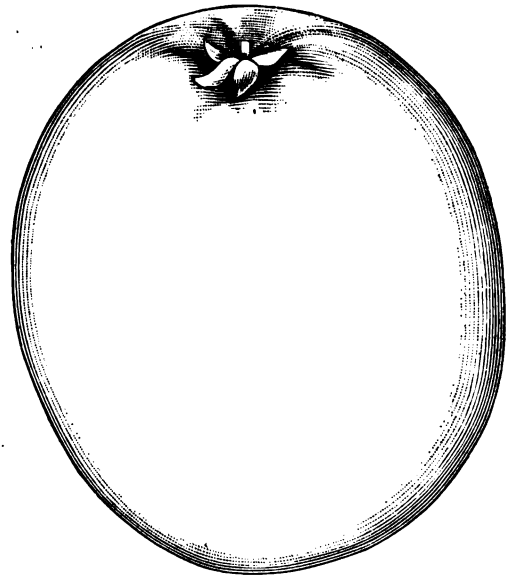

Figure No. 2.

Mr. A. B. Chapman, of San Gabriel, who grows this variety more extensively than any other orchardist in this State, speaks very highly of it as being one of the best varieties which he grows. For several years he has made large shipments of it to the eastern market, and the returns obtained have been very satisfactory to him.

The tree is of a dwarf habit, and can be set closer together in orchard form.

MEDITERRANEAN SWEET. (Figure No. 3.)

Fruit medium to large; pulp and skin of fine texture; very solid and few seeds; ripens late, often not until May or June. The tree is thornless, and of a dwarf habit of growth; inclined

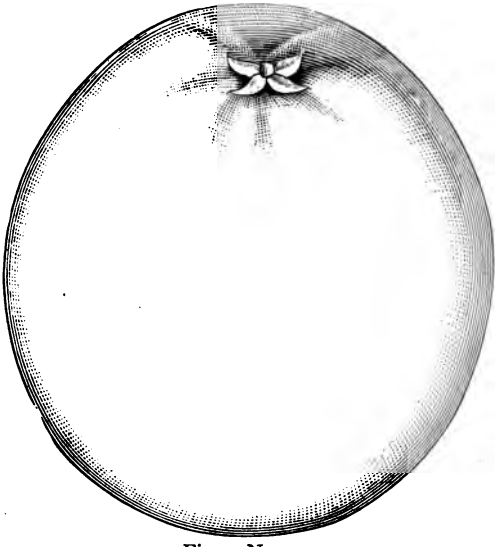

Figure No. 3.

to overbear. This variety is now well known, and much sought for in our markets. It was originally introduced by T. A. Garey, of Los Angeles.

RIO.

Fruit and tree resembles the Mediterranean Sweet; but the fruit is much larger, has a thicker skin, ripens late, very seldom can the entire crop be picked from the tree, as it does not ripen even; green oranges are found on the trees throughout the summer.

The tree differs from the Mediterranean Sweet, and the difference is distinguished from the long shoots that this variety puts forth resembling water sprouts. These shoots start from the side limbs as well as from the main or leader, and at the apex of these shoots numerous lateral branches put forth, form-

ing a large head, clear above the main mass of foliage; the tree is thornless, or nearly so, and is of a dwarf habit.

Paper Rind St. Michael. (Figure No. 4.)

Fruit small, round, very firm, and very juicy, pale, thin skin, grows very uniform in size, which is a great advantage in packing. They require but little assorting. Ripens late and keeps

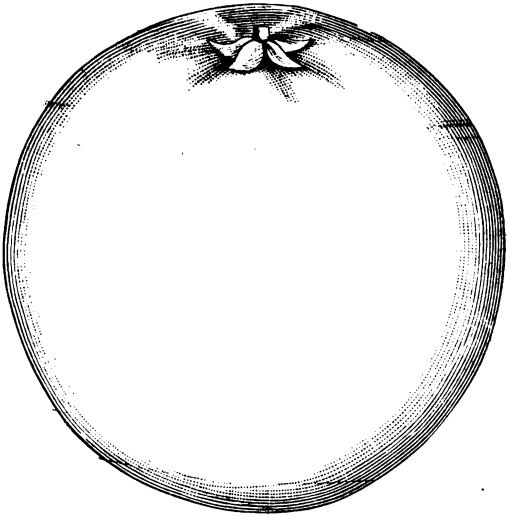

Figure No. 4.

well on the trees as late as August. The fruit does not drop from the tree when mature as other varieties do. The tree is of a dwarf habit, medium thorny, a good bearer, a very desirable variety. Dealers in San Francisco complain that they can not get enough of this variety for the local market.

Asher's Best.

The growth of this variety is very much like the Mediterranean Sweet; fruit, medium to large; the rind is very thin, juicy, sweet, and few seeds. It has been claimed to be a strain of the Mediterranean Sweet. Mr. Asher, of San Diego, after whom this variety was named, informs me that he bought the

tree for the Shaddock, but that after fruiting proved to be a very desirable variety. It was named after him by the Southern California Horticultural Society.

AZOREAN ST. MICHAEL.

Imported by Mr. Chapman, of San Gabriel; fruit, medium to large, and solid; pulp fine and melting; medium thin rind, flattened, few seeds; ripens early and keeps well on the tree; a rapid grower and a prolific bearer; is a large tree, and is recommended for standard purposes. This variety has fruited with Mr. Chapman for a number of years, and is considered by him to be very desirable and profitable to grow.

CHAPTER II.

FOREIGN VARIETIES RECOMMENDED FOR TRIAL.

CLASS B.

The varieties given under this head, aside from the "White and King Orange," are but little known in this State; they have, however, began fruiting to a limited extent and may yet prove to be very desirable. Professor Van Deman speaks very highly of them and recommends that they be thoroughly tried in this State; the White Orange should also be given a fair trial, although I doubt if it will ever become popular in the market, as people prefer that rich color the orange possesses. The King Orange is also new and well worth to be tried.

JAFFA.

Fruit of medium size, heavy, and juicy, thin skinned, also very smooth, a remarkably handsome grower, very straight, and nearly thornless.

MAJORCA.

Fruit medium size, shape nearly round, a very handsome smooth orange, little pulp and few seeds, heavy and juicy.

HART'S TARDIFF.

Fruit medium size, shape slightly oval, very solid, color pale yellow, heavy and juicy, ripens very late. In Florida it ripens in July and August.*

*Has fruited with A. D. Hayth at Riverside. Mr. Hayth says it is a late orange, but likes Mediterranean Sweet better.

Parson Brown.

Fruit medium size, shape round, and with very smooth skin; ripens early.

White Orange.

Fruit large, round, light yellow, flesh white, the color of a lemon when cut open, very sweet, texture fine, ripens late, is of a dwarf habit, is more susceptible to frosts than most varieties.

King Orange.

A native of Siam, imported by Dr. S. R. Magee, of Riverside; original trees were twenty-five in number. J. E. Cutter, of Riverside, worked this variety from the original trees on nine-year old trees standing in orchard, and was thus enabled to anticipate all others in obtaining fruit.

It appears to be a late orange, ripening in May and June, averages below medium in size, very rough rind, segments cleave when fully ripe. It is the highest flavored orange I have ever sampled; the tree is exceedingly thorny, resembling the lime. Of all oranges it is the least attractive in tree or fruit.

CHAPTER III.

FOREIGN VARIETIES TRIED AND NOT RECOMMENDED.

CLASS C.

The varieties named under this head are of foreign origin; after having fruited in this State for several years, they have proved to be of inferior quality, and their planting is not encouraged.

AUSTRALIAN NAVEL.

This tree does not resemble the Washington Navel in its habit; the foliage does, however, and in this way its identity has been much mistaken. The fruit varies greatly in size, all sizes generally being found on the same tree. A very shy bearer. Blooms profusely, but very few of the blooms set; often the trees are loaded with fruit, and after having attained the size of marbles drop to the ground, without any apparent cause whatever; it also has a tendency to split at the navel. The navel is usually large and prominent, unlike that of the Washington Navel, which is round and generally small. This variety was first introduced into California by the late Lewis Wolfskill; the trees were imported from Australia in 1874.

HOMOSASSA.

Of Florida origin, and is one of the best varieties propagated in that State. In this State it does not come up to the expectation of parties who have tried it; deep orange-red skin, flesh melting and juicy, seeds thorny.

LARGE ST. MICHAEL.

This variety does not resemble the Paper Rind St. Michael in the least. The fruit is large and very coarse; tree thorny; inferior.

SMALL ST. MICHAEL.

This is not an established variety. It is entirely distinct from the Paper Rind St. Michael; fruit small; thick, coarse skin; inferior.

DUROI.

Fruit, small to medium, firm, ribbed seeds, and a few thorns. Said to do well in Florida; it has not proved so in this State.

Peerless (inferior).
Churchupillas (inferior).
Moore's Seedling (inferior).
Moore's Thornless (inferior).
Charley Brown (inferior).
Heong Leong (no value).
Teneriffe (no value).
Nutmeg (no value).
St. Jago (no value).
Large Chinese (inferior).
Higgins (inferior).
Phillip's Bitter Sweet (no value).
Dixon (inferior).
Broad Leaf Mandarin (inferior).
Thorny Mandarin (inferior).
Coolie Mandarin (inferior).
Emperor Mandarin (inferior).
Emperor of China (inferior).
Vaniglia (inferior).
Hong Kong (no value).
Excelsior (inferior).
Portugal (no value).
Magnum Bonum (inferior).

Arcadia (inferior).
Florida Bitter (wild orange).
Large Chinese (no value).
Forbidden Fruit (shaddock).
Blood (no value).
Large Blood (no value).
Nicaraugua Blood (inferior).

CHAPTER IV.

BEST JAPANESE VARIETIES.

CLASS D.

The varieties under this head are those which are now being propagated in California of Japanese origin.

TANGERINE, OR KID GLOVE.

There are several varieties of Tangerines grown in California, and their true names are not known, as they were imported under Japanese names, and the labels were lost. Mr. A. B. Chapman and Horticultural Commissioner A. Scott Chapman have propagated a Tangerine orange, at their extensive orchards at San Gabriel, which is the best of that variety grown in this State. They are the largest growers of this orange in California.

The fruit is deep red, and quite small. When ripe the rind is easily detached with the fingers, without the aid of a knife. It is very sweet, being perhaps the sweetest of all oranges grown in this State. It is very popular, and a desirable variety.

A Tangerine orange box is 12 inches wide by 5 inches deep, and 16 inches long, inside measurement. About 125 to 150 oranges fill the box.

Mr. Chapman first set out the orchard with California seedling trees; and after they had attained a good size, budded the Tangerine into them, the buds being placed quite high into the largest limbs.

The buds were allowed to spread out and grow at will in this way. The trunks of the trees were soon covered by the

foliage, and in many instances the limbs touched the ground. The trees became beautiful, and very uniform in shape. This tree requires little or no outside pruning. The foliage having a weeping habit, makes it difficult to train as a tree, unless budded on large standard trees.

SATSUMA, SYNONYMS. (Unshiu, and Oonshiu.)

Fruit of medium size and flattened, rind easily detached, of exceedingly fine texture, sweet and nearly seedless. The fruit grows very irregular, all sizes being found on the tree, which makes them very difficult to pack, even when assorted into sizes, on account of their shape.

If for shipment they must be picked before mature, for when ripe the rind is loose from the pulp, and in packing will break and cause the orange to rot. The tree is remarkably hardy, having stood unharmed where all others in the same orchard were badly nipped by the frosts. The fruit from trees grown in California is much coarser than the fruit imported from Japan, grown either on our sweet seedling stock, or on the dwarf (Citrus Trifoliata) stock, upon which they are worked in Japan. The rind of most of the Japanese and Chinese varieties have a peculiar smell, and on this account they do not come into favor in the market.

NAGAMI-KINKAN, OR KINCQUAT. (Citrus Japonica.)

Fruit very small, oblong or olive shaped, rind thick, yellow, smooth, sweet scented, very little pulp, containing many seeds, tree dwarf (a bush), a prolific bearer. The fruit is edible whole (rind and all); the rind has a pleasant aroma, and combined with its juice makes it very agreeable. It is also valuable for preserves and marmalade, but the demand for this fruit being so limited, it would hardly warrant it to be propagated except for ornament. The eating of too much rind is not healthy.

CHAPTER V.

JAPANESE VARIETIES—CONTINUED.

CLASS E.

The varieties given under this head are grown in Japan, and described by the Japanese Agricultural Society. It is not known whether any of them are fruiting in California. Most of the varieties imported from Japan, after having fruited in this State, were given, and are known under different names, unlike those given below. The original labels having become lost, it is doubtful if any of these varieties will prove any better than those now grown in California.

NATSU-DAI-DAI.

Fruit very large, round, somewhat oblate. Rind thick, with rough surface. Color, bright yellow in first year; changes to dull yellow in second year. It also remains on the tree till the second summer, and then it is palatable. Pulp sweet, subacid, juicy. Good as summer fruit for table use.

DAI-DAI.

Fruit medium to large round. Rind thick, orange color, with bitter taste. Pulp sour.

KUNEMBO.

Fruit medium, round, sweet, oblate. Rind thick, deep orange color; very fragrant. Pulp sweet, delicious. Keeps well. Very good for table use.

YAMABUKI–MIKAN.

Fruit large, roundish, conical. Rind thick, pale color. Pulp sweet, subacid. Good for table use and for keeping.

SAKURA–JIMA–MIKAN.

Fruit small, roundish, oblate. Rind deep orange. Pulp sweet, juicy, most delicious quality. Very good.

SHIRAWA–KOJI.

Fruit small to medium, oblate, much larger than common Koji-Mikan. Rind thin, smooth, yellowish. Pulp sweet, subacid, free from bitter taste. Good in quality.

BENI–KOJI.

Fruit medium, roundish oblate. Rind thin, brilliant reddish color. Pulp sweet, subacid, with slightly bitter taste. Good as an ornamental dessert dish.

KIN–KUNENBO.

Fruit medium roundish. Rind thin, orange yellow, adhering to pulp. Pulp sweet. It much resembles the True Sweet orange in form and color, but little inferior in quality. Keeps well. Good for table use and for keeping.

IUKO.

Tree very hardy. Fruit medium, roundish, much resembles *Iudzu* in form; rather smooth on surface. Rind thick, yellow color. Pulp sweet when quite ripe.

TOKO–IUDZU.

Tree vigorous and prolific. Fruit small, round. Skin rough, pale yellow, smell not as good as common *Iudzu*. It keeps well on the branch of the tree the second year.

JAGATARA-MIKAN.

Fruit very large, conical at the end. Rind very thick, orange color with rough surface. Pulp sweet, subacid, juicy. Good for table use and for keeping.

MARU-BUSHIUKAN.

Fruit large or medium; closely resembles the citron in form, but it has little fragrance and an acid like the citron. Rind extraordinarily thick. The rind is used for confectionery.

TO-MIKAN.

Fruit large to medium, round or globular, much resembles the true sweet orange in form. Rind rather thick, orange color. Pulp sweet, juicy. Keeps well.

KINU-GAWA-MIKAN.

Fruit large, oblate. Rind thin, smooth, yellowish orange color. Pulp sweet, juicy. Keeps a long time.. Good in quality.

BUSHIU-KAN.

Fruit rather large size, quite solid, with scarcely any pulp or cells, and divided at the end into five or more long, round lobes, on which account it is called Bushiu-Kan, or Budah-fingered orange. The rind is pale yellowish color. The fruit has a most agreeable perfume, and is much esteemed for an ornamental pot culture. The young fruit is made into confectionery, and is esteemed for its fragrance.

TO-DAI-DAI.

Fruit much resembles the Yamabuki-Mikan in form, but slightly differs in color and quality. Pulp sweet and delicious. Good for keeping.

BENI–MIKAN.

Fruit small, roundish, oblate. Rind thin, bright reddish color. Pulp juicy, rich in flavor. One of the best as an ornamental dessert dish.

KAWACHI–MIKAN.

Fruit small, roundish, oblate. Rind thin, bright reddish color. Pulp sweet, subacid. Good for table use and for keeping.

KINOKUNI–MIKAN.

Fruit medium, oblate. Rind thin, orange-yellow color, smooth surface. Pulp yellowish, sweet, juicy. One of the best for table use.

KOJI.

Fruit medium, oblate. Rind very thin, pale yellow. Pulp subacid, with slightly bitter taste. Though it is inferior in quality, it ripens earlier; and also the flower bud, or even the flower, is used as a spice.

IUDZU.

Fruit medium round. Rind very thick, yellow, coarse uneven surface. Pulp subacid, many seeds. Rind fragrant smell, slightly bitter taste. Much used for cookery and confectionery. The unripe fruit and the blossoms are also used as a spice.

MARUMI–KINKAN OR KINCQUAT.

Fruit very small, roundish or globular. Pulp small, containing large seeds. It is eatable, rind and all.

NARUTO–MIKAN.

Fruit medium round, rather large. Rind thick, yellowish, rough on surface. It is sour in the first year, and remains on till second year, when it becomes delicious. Pulp sweet, juicy. Good as a summer dessert dish.

KABUSA.

Fruit large, round; much resembles the Dai-Dai, above named, in form, color, and quality. It is distinguished for having a single instead of a double calyx, as the Dai-Dai. The use and quality is strictly the same as the Dai-Dai.

AMA–DAI–DAI.

Fruit medium; much resembles the Kin-kunembo in form. This will keep as long as the true sweet orange, but is somewhat inferior in quality.

Comments on the above list.—From specimens received, and from lithographic plates issued by the Japanese Agricultural Society.

NATSU–DAI–DAI.

A species of Pomolo.

DAI–DAI.

Very thick rind and very coarse.

YAMA–BUKI–MIKAN.

Greenish color, very thick, and coarse.

SAKURA–JIMA–MIKAN.

Very small and flattened, very coarse.

SHIRAWA–KOJI.

Small, with very thick rind and many seeds.

BENI–KOJI.

Very highly colored, with thin rind, and few seeds.

KIN–KUNENBO.

Thin rind and few seeds.

IUKO.

Small, with very thick rind and full of seeds.

TOKO–IUDZU.

Very small, resembles our sweet lemon.

JAGATARA–MIKAN.

Pomelo, with white pulp.

MARU–BUSHIUKAN.

Resembles the Chinese lemon grown in this State.

TO–MIKAN.

Color rusty brown, with very thick rind, coarse, and full of seeds.

KINU–GAWA–MIKAN.

Very large and bitter.

BUSHIU–KAN.

Bitter, resembles the Chinese lemon. Specimens received were very unsightly, like a bunch of fingers grown together.

TO–DAI–DAI.

Color, rusty brown; very coarse and bitter.

BENI–MIKAN.

Very small; color deep red; few seed, and very thin rind.

KAWACHI–MIKAN.

Resembles the Mandarin. (See Class F.)

KINOKUNI–MIKAN.

Resembles the Tangerine, or Kid Glove. (See Class D.)

KOJI.

Color, dark rusty brown; the rind the thinnest of all Japanese varieties; but with many seeds, and bitter.

IUDZU.

Very thick rind, coarse and bitter.

MARUMI–KINKAN OR KINCQUAT.

Very small; the smallest of all species; the size of a medium size cherry, and full of large seeds.

KABUSA.

Pulp fine, with few seed, but very thick rind; pulp white, like a lemon.

NARUTO–MIKAN.

Color, rusty brown, nearly black; inferior.

AMA–DAI–DAI.

Medium thin rind, pulp white, few seeds, color rusty brown, bitter.

NOTE.—The description given by the Japanese Agricultural Society differs greatly from the specimens received. Out of the entire list the Kinokuni-Mikan, Kawachi-Mikan, and the Satsuma are the only varieties worth propagating, and that only to a limited extent.

CHAPTER VI.

ORNAMENTAL VARIETIES. (Japanese and Chinese origin.)

CLASS F.

DWARF MANDARIN.

This tree is very ornamental. The fruit is very red in color; flattened at the poles; generally has an outgrowth at the bloom end, resembling the Australian Navel.

When the fruit is unripe it is very bitter; but when fully ripe, and if the rind is separated carefully, can be eaten. The rind has a peculiar aroma, which is disagreeable. Through the summer, when all other oranges are gone, this tree is full of fruit. As few care for it, the fruit being of such a deep red, makes it highly ornamental.

POMELO.
~~PUMALO.~~

Ornamental only. A tree with large deep green foliage; fruit very large, weighing from 2 to 5 pounds each; has a peculiar odor; not eatable, unless in strictly tropical countries.

POMELO SYN. GRAPE FRUIT (CAL.).

This fruit is claimed to be of distinct species, but is a variety of the Shaddock; fruit of a pale yellow, resembling the Citron; skin very smooth; pulp subacid, with a decided flavor of grape, hence its name; tree very ornamental; semi-dwarf.

SHADDOCK. (Mammoth. Figure No. 5.)

Native of China or Japan. It was brought to the West Indies by one Captain Shaddock, from whom it has taken its name. It is also known as Pumpel-mouse.

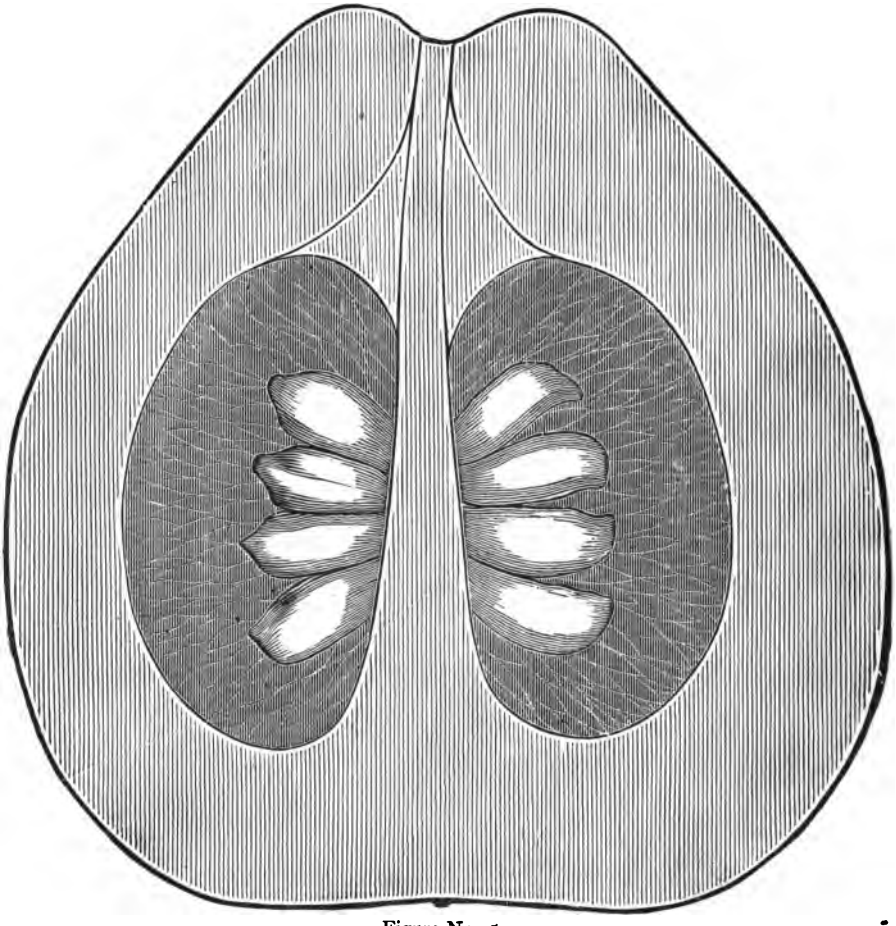

Figure No. 5.

Fruit very large, with smooth skin, pale yellow, and very glossy. The rind is very thick and spongy, and very bitter; pulp dark green. Figure No. 5 represents a Shaddock cut open, showing thickness of rind and pulp.

SHADDOCK. (Blood.)

This variety resembles the Mammoth in all respects, except that the pulp is red.

BOUQUET.

Ornamental only. Florists value its bloom for its fragrance and large size, and for this purpose it is largely cultivated. Fruit very bitter.

BERGAMOT.

Ornamental only, fruit large and very rough, flattened; has a pleasant aroma; is grown by florists for the bloom.

MYRTLE LEAF.

Ornamental only; tree very dwarf; foliage densely packed together; small leaf, the shape of the myrtle; fruit, bright red and very bitter.

VARIEGATED ORANGE.

Ornamental only; tree dwarf; leaf variegated, with white margin and green center; very glossy; stem white and green; fruit striped with white, and very bitter.

DWARF ORANGE (CITRUS TRIFOLIATA).

Ornamental.—This stock is used for dwarfing purposes. It is a hardy shrub of the citrus family. The Japanese dwarf their varieties by budding on this stock, which is of a very slow growth, and produce orange trees suitable for pot growing.

CHAPTER VII.

BEST VARIETIES, CALIFORNIA ORIGIN.

CLASS G.

The advantage a good seedling (of home origin) has over any foreign variety is that it is hardy, and can be planted in localities where the temperature gets so low as to prevent foreign varieties from thriving; they will also make a larger tree. Such are the varieties given under this head:

WOLFSKILL'S BEST, OR FAVORITE. (Figure No. 6.)

Originated by J. W. Wolfskill, of Los Angeles. A good grower. Original tree now stands over thirty feet high, and as large as any seedling of the same age. The original tree is not very thorny. Thorns decrease in size as the tree grows older. Fruit is of excellent quality, somewhat flattened, deep orange red, fine grain and pulp. A good bearer; early, and should be picked before May. Ripens ahead of all other native varieties; is largely cultivated in this State; the choiceest of all native varieties.

MAYBERRY'S PREMIER.

Originated by E. L. Mayberry, at El Molino Ranch, near San Gabriel. The original tree (a twin tree) stands about thirty feet high. The orange is medium in size, but of a deep red color; rind thin and very smooth; pulp and grain very fine. The old tree has very small thorns. Budding appears to improve the growth of the trees. Spring buds generally make large trees the first year. This variety should be budded

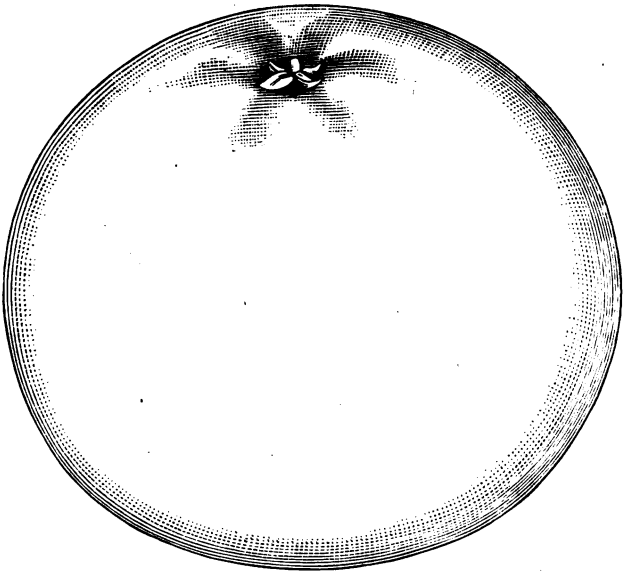

Figure No. 6.

on thrifty stocks, able to hold the weight of the bud after a year's growth.

BALDWIN'S FAVORITE.

Originated by the late Lewis Wolfskill at the Santa Anita Ranch, Los Angeles County. Is a good seedling, but lacking qualities which the two varieties above mentioned possess.

WILSON'S BEST (Lake Vineyard).

Originated by the late B. D. Wilson, at San Gabriel; a good variety. Original tree is very large and quite thorny.

KONAH.

A California seedling from seed grown on Konah Island. Fruit large, rough, and thick skin. Tree very ~~horny~~ thorny and very hard to keep in shape, ripens early, and is considered by many to be a very desirable variety. I have found that it will do better in some localities than in others.

NEW VARIETIES (Home origin).

COOPER'S SEEDLING.

Originated by Hon. Ellwood Cooper, at Ellwood, Santa Barbara County. Fruit of medium size, oval; pulp, very fine, and melting. Color, pale yellow. Very thin skin; seedless. A thrifty grower, and a prolific bearer—a very desirable variety.

KERCHEVAL'S QUEEN.

Originated at Los Angeles. Fruit above medium size, excellent flavor, few seeds, and medium thin rind. The tree is a vigorous grower.

CHAPTER VIII.

VARIETIES OF CALIFORNIA ORIGIN NOT RECOMMENDED.

CLASS H.

The varieties under this head are of inferior quality, and their planting is not recommended, as, since they were introduced, the varieties in Class G have been found most profitable to grow.

NICARAGUAN.

Originated by the late Dr. J. Shaw, of Los Angeles, from seed from the Isthmus. Fruit very large, thick-skinned, inferior.

TAHITI.

Originated by the late Dr. Shaw, from seed from Tahiti. Same as common seedling fruit.

I. X. L.

Originated by J. W. Wolfskill, of Los Angeles. Raised from seed imported from Tahiti. Tree very thorny.

WOLFSKILL'S EUREKA.

Originated by the late Lewis Wolfskill, at Los Angeles. Fruit very small, round in shape. No better than the other varieties named.

CHAPTER IX.

MISCELLANEOUS VARIETIES GROWN IN FOREIGN COUNTRIES AND IN FLORIDA.

CLASS I.

The varieties under this head are the leading varieties grown in foreign countries, as well as those that in recent years have been introduced into Florida; also the varieties of Florida origin. Many of these varieties do well in their native country, but when planted in this State do not come up to the expectation of those who have imported them. Nevertheless it is well to experiment.

NOTE.—The varieties imported from these countries, and now fruiting in Florida, and in California, are left out of this list. They will be found under other heads.

PORTUGAL.

Selecta (highly priced).
China (good, but does not bear transportation).
Navel (same as Australian).

TURKEY.

Candian (considered very good).
Syrian (good).
Chio (common).
Paros (common).
Archipelago (good).
Mitylene (good).
Tenedos (good).
Samos (good).

ASIA MINOR.

Scio (light yellow, good).
Parakila (deep red, very large).
Kan (blood red color, and very sweet).

SYRIA.

Accawy (roundish in form, best in Syria).
Belady (very thick rind).
Shamouty (oblong, thin rind, early).
Bisry (fine flavored).
Tarsus Sweet (common).
Tarsus (sour).

ITALY.

Melangolo (sour stock).
Red Juiced Orange (highly priced).
Double Flowered Orange.
Sweet Orange (citrus bigarradia dulcis).
Mandarin (citrus deliciosa).
Vanigila.
Sicilian (common).
Oval (Marina).
Round (Marina).

SPAIN.

Naranjo Dulci Franco (sweet orange).
Naranjo Bigarrado Franco (sour).
Naranjo Bigarrado Gallesio (bitter).
Naranjo China Ligetima (very sweet thin rind, the most highly priced).
Havana Dulci.
Naranja Cumun (common).
Early Spanish (excellent).
Naranjo Agris (sour).
Catania.
Sour-Sweet (common).
Loretto (similar to Valencia late; specimens show no difference).

AUSTRALIA.

Sabina (very good).
Navel.
Paramatta (from Sidney).
Poor Man (from Sidney).
Maltese Oval.
Large Marmalade.
Bitter Loose Jacket.
Chinese Oval.
Sweet Seville.
Bitter Seville.

AFRICA.

Sweet Orange (common, but good).
Imperial (very large; good).
Royal (small; good).
Silver Leaf.
Double Flower (ornamental).
Violet Flower (ornamental).
Balearic, or Malorea (large; thin skin; productive).
Portugal, or China (fruit very large).
Orange of Nice (very good).

JAMAICA.

Comprida (remarkable for its aromatic flavor).
Ombigo (good).
Lisbon Orange (early and good).
Jamaican (common, but good).

FLORIDA.

Sweet Seville (Golden Angel; sugar sweet; early).
Early Oblong (Thornless Bell, Florida origin).
Egg (Beaches No. 1, Florida origin).
Botelha (ripens late).
Dulcissima.
Prata.

Exquisite.
Cleopatra (very small Tangerine species; of little value).
Old Vini (Beach's No. 4; Florida origin).
Arcadia.
Prolific (Rivers).
Star Calyx (desirable).
Acis (ribbed and very good).
Centennial, Hart's (very high flavor).
Dr. May's Best (Drummit).
Nonpareil (Florida origin, early).
Dr. Cogill's Tangerine (considered very good and above all others; Florida origin).
Pernambuco.
Mediterranean, Sanford's (same as Garey's).
Parson's Navel (like Australian; Florida origin).
Italian Navel (like Australian).
Double Imperial Navel (not as good as Washington).
Bostrom's Prize Navel (Florida origin).
Richardson's Navel (Florida origin).
Paragon (Tangerine species; of Florida origin).
Bijou (Moragne's Tangerine, Dancy's Tangerine; Florida origin).
China (Tangerine, Willow Leaf).
Ruby (Tangerine species; ruby red).
Golden Variegated (Mandarin species; ornamental).
China Sweet (Mandarin species; of Florida origin).
Cluster Grape Fruit (bears in clusters; ornamental only).
Triumph Grape Fruit (cross between orange and grape fruit).
Markam's Best (Florida origin).
Higley's Late (Florida origin).
Wilder (Florida origin).
Dixon (Florida origin).
Krause (Florida origin).
Pride of Malta (medium size, flattened).
Everbearing (Florida origin).
Otaheite (dwarf; reddish flowers; ornamental only).
Peerless (Rembert's best; fruit large, good).
Madame Vinous (Florida origin).
Cummingham (Florida origin).

Tony (Florida origin).
Pineapple (pineapple flavor).
Spratt's Harmon (Florida origin).
Bell (pear shaped; Florida origin).
Pierce's Blood (Cate; Florida origin).
Round Sweet Blood (Florida origin).
Armory's Blood (Florida origin).
Sall's Blood (Florida origin).
Mediterranean Blood.
Thornless (Florida origin).
Foundling (Florida origin).
DeBarry's Seedling (Florida origin).
Dr. Starke's Best (Florida origin).
Dann's Best (Florida origin).
Mellwood Seedling (Florina origin).
Bitter Sweet (Mandarin species).
Osceloa (Florida origin).
Brazilian (inferior).
Oce (Florida origin).
Prata, or Silver (Florida origin).
Beach's, No. 5 (pear shaped; Florida origin).
Phillip's Bitter Sweet (hybrid of wild and sweet orange).
Foster (Florida origin).
Indian River (tree very thorny).
Militensis (early bearer, strong grower).
Marquis (from Malta).
Navel, Sanford's (from Belgium).
Orange Lake (Florida origin).
Queen.
Queen of Halifax.
Sustain Navel.
Sirinaggar-Cindra (from Northern Hindostan).
Velvet Peel (ornamental).
Whitaker (Florida origin).
Whitaker, No. 2 (Florida origin).
Mary Brement (Mandarin species).
Indian River Sweet (Florida origin).

CHAPTER X.

THE ORANGE CROP; GATHERING, CURING, SHIPPING, ETC.

TIME OF SHIPPING.

In this State March and April, and even May and June, are the best months in which to ship the general crop.

Oranges grown in the northern and central part of this State color much earlier than those grown in the southern counties, but no oranges are ripe then (excepting early foreign varieties), but being highly colored, they can be placed in the market in December and January.

PICKING.

The tree should never be picked clean; only the ripe fruit should first be picked, thus lightening up the trees. The clean, bright colored, smooth, fine skin, and firm oranges will always command the best prices.

ORANGE CURING.

The fruit should be handled with care. It is better to (clip) stem cut than to pull the orange, as in pulling there is danger of tearing the skin. The fruit should not be packed fresh from the tree, as when packed it will heat and sweat in the boxes at an ordinary temperature, and as the entire contents in the box becomes damp, there is great danger from rot and decay. The fruit should be picked in boxes and left under the tree three or four days, to allow the rind of the fruit to shrink and to lose the surplus moisture in the rind. Another way is to place them in heaps in a dry room. Unless the weather is very cool they go through a natural sweat, in which

the surplus moisture escapes and the rind becomes tough and pliable; many unseen imperfections, such as slight bruises, etc., will develop into spots and permit a more certain selection of the perfect fruit for market. When the weather is too cool the oranges do not sweat naturally; they are then covered with blankets, etc. During the sweating process the fruit should be carefully examined from time to time; the doors should always be kept shut, and a current of air should not be allowed to pass through the room. In three or four days a slightly sticky appearance will be noticed on the rind; then the fruit is wiped dry and put into boxes, filling them half full, and are left in the room until dry; then they are ready for packing. They should be in such a condition that when they are packed they will not become loose, so that every time the car shakes they will knock one against the other; this is the great secret of loss in fruit, especially when shipped to the eastern market.

Points in Packing.

The fruit should be carefully assorted as to size and color. Small and large oranges should never be put into the same box. The wrapper should be careful to reject every bruised or otherwise injured orange. The packer should be careful not to put different varieties in the same box in packing. The oranges should be placed one by one, closely together in layers, so that there can be no sliding or rolling of the fruit in the box. The top layer should project not less than one half inch nor more than three quarters of an inch above the side of the box, so that the top, when nailed on, should hold the layers firmly in their places, even after there has been some shrinkage of the fruit.

Wrapping.

The fruit paper used for wrapping should contain as little oil as possible, so that it will readily absorb and throw off moisture. Wrapping oranges is regarded by many as being useless and unnecessary. Experience has taught the orange growers in the last few years that it is better in every way to wrap the fruit, for it carries better, especially when the fruit is to be transported a considerable distance by rail.

Size of an Orange Box.

The standard size orange box is twelve inches by twelve, by twenty-six and a half, outside measurement, with a partition exactly in the middle. They should be made of light and well seasoned material, neatly and strongly put together.

Standard Counts.

The standard counts to the box are eighty, ninety-six, one hundred and twelve, one hundred and twenty-eight, one hundred and forty-six, one hundred and sixty-four, one hundred and seventy-six, two hundred, two hundred and twenty-six, two hundred and fifty, and two hundred and eighty-two. When the fruit is graded to these sizes, and properly packed in regular layers, they fit and fill up the box in the best possible manner. The number of oranges and brand should be marked on each box. This is important, as buyers always prefer to know just how many oranges they are buying. The number contained in the standard box also gives an exact idea of the size of the fruit.

CHAPTER XI.

PROPAGATING, PLANTING, BUDDING, GRAFTING, PRUNING, DISEASES, ETC.

PLANTING FROM THE SEED.

Questions are often asked, do oranges come true from the seed? The seed of the orange has seldom been known to produce fruit equal to that of the parent tree. If the seed of an orange or lemon is planted, the fruit of that tree will be different from the fruit from which it came; it is in this way that varieties are produced. However, it comes truer to seed than most fruits.

SEEDLINGS.

Many who prefer to plant their orchards with seedlings, generally select the seed from a good orange. For this the Tahiti orange has been much used, and the trees grown from it have produced good fruit. Where orchards are planted from the same seed, many trees differ from others both in foliage and in fruit.

HYBRIDIZED SEED.

Great care should be taken in planting seed intended to grow seedlings for orchard planting. The seed should be unhybridized. In this State lemons and limes are generally mixed in the orchard, or in the neighboring orchards, and bees intermix the pollen of the different flowers. It is in this way that worthless hybrids are produced. Therefore California grown seed should never be planted to make a seedling grove. They will do for stocks for budding upon.

Taking the Seed Out of the Fruit.

The fruit is piled into heaps or put into barrels to rot. When the fruit has decayed so that it will break into many pieces when handled, it is then crushed in a tub or barrel and the seed is washed out. A coarse sieve is used; the soft substance of the fruit will pass through the wires, leaving nothing but the seed in the sieve. The seed is washed in a place where water can be used freely, as considerable is required to do the work properly.

Keeping Seed in Sand.

The seed of the orange should not be allowed to get dry after being taken from the fruit. If you are not ready to plant them, take and put them in moist sand. In this way they can be kept until everything is prepared.

How to Put Them in Sand.

Take a shallow box, say five inches deep and not more than thirty inches square, fill it half full of moist sand, then put the seed on top, about two inches deep, and throw on the top of the seed considerable sand and mix it together with the hands. This is done so that the sand will stick to the seeds, and not allow the seeds to adhere to each other. Then fill up the box with sand and let them remain until they are to be planted. The boxes can be stacked one upon the other.

Taking Them Out of the Sand.

The seed bed having been prepared, have a coarse sieve, and take the top box and dump its contents into the sieve. This must be done with care so as not to bruise the seed; then shake the sieve, the sand will pass through, leaving nothing but the seed in the sieve; then empty the seed into a tub of water, all the imperfect ones will rise to the top. They should be thrown away, as they will not germinate. Those that sink to the bottom are the ones to plant, for they will be found to be large and healthy.

THE SEED BED.

The seed bed should be inclosed with boards eighteen or twenty inches wide, set on edge about four to six feet apart. The bottom should be floored, so as to prevent gophers and ground moles from entering the seed bed. In no case should the seed be sown in a bed in open ground, for a mole in one night will destroy nearly all the plants. Laths should be nailed on top, leaving a space of one half inch between them to protect the seed from being scratched up by birds. A covering of thin muslin should be put on top of the laths to protect the young plants from being scorched by the hot sun. If the weather be cloudy, it is well that the covering be removed to allow the bed to get warm. It is better to plant the seed thickly and broadcast; as all plants are to be removed, it does not matter how thick they come up. The seed should be covered from one to two inches.

TIME OF PLANTING THE SEED.

Many plant the seed in January and February. This is entirely too early, as the seed will not germinate until spring. April, and even May, are the best months, as the ground is then warm and all danger of frost is over. The seed bed should be kept moist, but not too wet.

TRANSPLANTING.

In one year the plants will be large enough to be transplanted in nursery form. A section of the bed should only be dug up at a time; the plants should be assorted; the very small and delicate ones should be planted in shallow boxes by themselves and kept another year; they being so small and delicate are generally scorched by the sun when planted in the open ground, and those that do not generally remain small in the nursery.

Distance of Nursery Rows.

The rows should be far enough apart to admit a cultivator between them. It is a mistake when the rows are set less than four feet apart, as, when after being budded, many buds are knocked off by the horse or the traces rubbing against them. I prefer the rows to be six feet apart. This will give ample room for cultivation; and also when in digging up the trees a small narrow sled can be run in to haul them to the head of the rows without rubbing against the nursery stock.

Distance in Nursery Rows.

Planting close together in the rows will tend to make feeble and slender trees. If it is intended not to sack the trees when they are to be taken up, then the plants can be set from eight to twelve inches apart, and they will make strong and thrifty stocks, but if it is intended to sack any of them, then it is too close. They should be at least eighteen inches apart; this will give the digger enough space to take up trees between others, which is generally done. As the trees do not grow even, certain sizes are taken up and others left to grow awhile. It also has the advantage that the roots are not cut too short, which is apt to be where they are planted close together.

It is well to protect the trees in the nursery from frost through the winter by building over them a frame, on top of which brush is laid thickly; in this way the plants will pass through the winter unharmed. In the spring, after all danger of frosts are over, the brush and staging are removed. For this cypress brush is mostly used.

Trimming the Stock.

The plants should not be trimmed until at least one year after being planted; they should be left to grow at will the first year. If the plants are trimmed when too young they will make slender and feeble stock. It is better to let the plants grow for a year, giving them the best of care; then in the following spring, as early as possible, say in February, the plants

are trimmed, leaving a clear stock. The trimmer should also remove all thorns for about six inches from the ground, as they will be in the way of the budder, and all cuts should be made close and covered with rubber paint, so that they may soon heal over. The brush is then gathered and burnt. As the ground is packed by the trimmers, it is loosened by running a cultivator between the rows; then they are left to be budded.

Spring Budding.

Generally in the months of March and April, as soon as the trees begin to put forth, and the sap flows freely, it is then the time to bud. Everything should be prepared; no time should be lost, as the buds first inserted will sometimes start in less than three weeks, with much vigor, and by summer will have a large and thrifty top. The buds should be looked over at least ten days after they are inserted, and all those that show signs of dying should be rebudded, in order to give them an early start, and that they grow even with the others.

Summer Budding.

Summer budding is generally done in July and August. It is not considered as good as spring budding, because the buds do not start even; and as the greater portion of them start so late, their growth is so tender by the time winter sets in, that if they pass through it, become prematurely hardened by the cold weather, which causes the tree to become stunted.

Selecting Buds.

In selecting buds from a tree, nothing but the best buds should be selected. This point is of practical importance, for if weak or immature buds are inserted, they remain on the tree at least a year before starting. Immature or imperfect buds have often been inserted into trees, as good buds have been scarce. In order to start them, the tops of the trees were removed; the buds not being mature, failed to start. The growth and all suckers were from time to time removed

to see if the buds would start; however, they did not, and the continuing suckering caused the trees to die.

A New Method.

Meeting with such difficulty in making buds grow on old wood, led me to carry on a series of experiments, to find, if possible, a way by which buds would grow in old and large limbs; that if this was accomplished, it would do away with having to cut the tops and wait for the new wood to grow, in order to bud into it.

The Method.

The very largest buds were selected, those having a large thorn (Figure No. 7). The bud was cut, leaving into it considerable wood, and at least one inch long, taking from the limb it was cut at least one half of the wood; then with the sharp point of the knife the wood in the bud was gouged out.

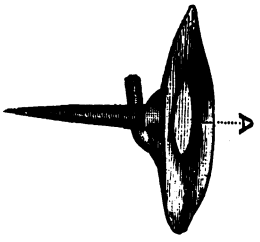

Figure No. 7.

Great care was used not to run the end of the knife into the bark of the bud on either side, the wood being carefully removed, leaving but a very small portion of it, only enough to hold the thorn firmly to the bark of the bud, as shown in Figure No. 7, A. It was then inserted into the tree, and then wound tightly with twine. The end of the thorn should not be cut, as it causes the bud to wilt and die. The result of this experiment was very satisfactory and successful. This was done in spring, summer, and fall; the buds being large and plump, made good growth and not two per cent were lost. This budding is best to be done in the spring, as there is at this time an abundance of sap. The buds will also take better than when inserted later. About an inch of the bark above the bud in a circle can be removed to force the sap into the bud, which will start before the top is cut away. The top is left on the tree to protect it. The twine should be left on the trees as

long as possible, because the bark is thicker on a large tree than on a small one; and if the twine is removed too soon the bark will open, caused by the action of the atmosphere, the bud will be left exposed and will dry. However, great care should be taken not to leave it on too long, as it will cut into the tree. If upon examination it is found that it is working into the bark, it should be loosened, untied, and tied (with the same twine) over again. If this work is done in the summer or fall, the buds must be left to lie dormant through the winter. In early spring the top of the tree is removed, and the bud allowed to grow; but in no case should the entire top be removed. At least one large limb should be left to force the sap into the buds, and all the lower brush on the trunk should be left to protect it from being sunburned. This is, however, removed as soon as the buds are able to shade the trunk and take from it the sap flowing. When these large limbs are removed, the cuts should immediately be painted with at least two coats of the best rubber paint, to protect them from cracking, and so that they may heal and become healthy.

THORNLESS BUDS.

The advantage in budding with thornless varieties is that the wood in the bud can be removed with great ease, which is a great advantage in budding, as when the wood is removed nearly every bud will take; that is when the wood in the bud is removed without having to use a knife. There being no thorn in the bud, the wood is removed from it as easy as the wood in a peach bud; it also leaves the bark of the bud uninjured. This can not be done with a thorny bud, as the thorn is attached to the wood in the bud, therefore the necessity of cutting it out.

GRAFTING CITRUS TREES.

This method is entirely disregarded in this State, Budding being surer, and the most simple and best. Grafting citrus trees is not recommended.

Cutting Off the Tops.

It is well not to allow the strings to cut into the tree. They should be watched. In the spring, as the Nursery trees swell very fast, three weeks is long enough for the strings to remain on them; but the tops should not be cut off then. The strings should be removed, the nursery irrigated and cultivated. This will force new growth, and the tops should then be cut back from four to eight inches above the bud. After the bud has grown about six inches or more, it is tied to the stock, as shown in Figure No. 8. When the bud has become stocky and able to support itself, what remains of the top is cut away, as shown in Figure No. 8, *a*. The cut should be made smooth, and painted with rubber paint. This helps the wound in healing over, and protects the stock from the action of the atmosphere. Great care should be used in the cutting of the tops; that it be done at the proper time, and that they be not cut so near the bud as to endanger it. I much prefer to leave a little brush on the part cut, this to be removed after the buds have started.

Fig. No. 8.

Starting the Bud.

When the stocks put forth the buds generally start also; and the suckers being very tender, are removed by hand (thumb pruning), breaking at the touch. Some prefer to use a sharp knife, as in many instances where they are knocked off with the hand others will sprout around where they were knocked off. Cutting them with a sharp knife has also the advantage that no others will grow where any had been cut, and the cut being made clean will give the tree a smooth body, and as the tree grows very little ~~sucking~~ will be required. When they are removed by rubbing with the hand the trunks generally become rough, and the ~~sucking~~ much greater.

After the buds have made a year's growth, they are ready for market, although two-year old buds are more preferable.

TAKING THEM UP FROM THE NURSERY.

Balling System.—If only one tree is to be taken up, that is between two others, a narrow trench is made within six inches of the tree, and just in front of it, and then the tap root is cut about eighteen inches or so deep, then with a spade a round oblong ball is cut leaving in it the tree. For this it is better that two men do the work, as it is more expeditious, and better work can be done. The spade should be very sharp, or in cutting the roots the jar will break the ball. If large roots are to be cut it is better to use pruning shears to cut them. When trees are taken up with a sound ball of earth the leaves will hardly wilt. Citrus trees should never be transplanted if suffering for water.

PUDDLING SYSTEM.

Puddling is practiced where the soil is so loose that sacking is rendered impossible; many prefer this system to any other, as it gives the trees larger and more roots; and where all due precautions are taken, puddling is the best system, and considerable expense is saved, especially where a large orchard is planted. To be successful the following rules should be carried out: First, the holes should be all dug before any of the trees are taken out. Second, the roots of the trees should not be exposed to the sun, even if only for a few minutes, for the fibrous roots are so delicate that the sun will dry them and they will perish.

DIRECTIONS.

A trench is dug on one side of the row, the taproots are then cut, a hole is made in the ground and filled half full of water, then soil is thrown into it and worked with a hoe. The puddle should be thin enough so that when the roots of the trees are put into it that it will stick to them, at the same time wetting every part thoroughly. The trees are then taken up; the man cutting the remaining roots with a spade will cause the trees to fall into the trench, the soil is shook from the roots, and they are immediately dipped into the mud, or puddle. They are then handed to a man who places them on

wet straw in the wagon; a large canvas, or covering, is placed on the wagon to prevent the sun from drying the roots. The wagon is then driven to the field, where the holes were dug and prepared. The driver then hands the trees, one at a time, the planter holes the trees in the hole, while his men fill it up with dirt, first throwing in the moistest; the planter presses the soil very lightly and goes to the next one. (It is best to have plenty of help, and the work done as quickly as possible.) The tree having been set, a basin is made around it and a couple of buckets of water poured into the basin; this will cause the soil to settle and keep the tree fresh until water can be run down the rows in furrows. I have set out several orchards in this way, and have lost but few trees. An orchard I set out three years ago in this way proved a great success, and out of six hundred trees only one failed.

When to Plant.

Citrus trees are transplanted at various seasons, preference being given to one of its dormant periods, occurring during the year.

Trees transplanted in the winter, when the ground is cold, will remain in it until spring without growing; therefore it is better not to transplant citrus trees until the ground begins to get warm. The nearer an orange tree is to starting new growth, the greater its strength and root power, and this is the best time for transplanting; also after they have made their first growth and before starting the second time in spring.

Topping the Trees.

When a tree is taken from the nursery the tops should be cut back; the branches should be so cut that in starting will form a fine shaped head to the stock. This is done because the evaporation of the leaves is rapid, and in many cases, where the long tops are left on, causes the circulation of the tree to dry, and also the bark will shrivel before the roots have assumed their natural functions. If the leaves commence to dry, it is better they should be cut, to prevent them from commencing to carry off the fluids of evaporation.

Preparation of the Soil.

The land should be thoroughly worked through the winter, and prepared to be planted in the spring, when it becomes warm; also all weeds and stubble plowed under will be decomposed and serve as a fertilizer to the orchard. The thorough working of the soil liberates crude gases and changes the nutritive principles to a form more readily assimilated by the tree.

Soil for Orange Trees.

An orange tree should never be planted on heavy low ground, or on low damp ground, where water can be reached within a few inches from the surface, and never should an orange tree be planted on adobe soil; they will always be troubled with gum disease, and will also be nipped by frosts every year. A deep, rich, porous soil is not only necessary to insure a good yield of fruit, but absolutely necessary to give the trees a vigorous growth. Trees on heavy adobe or poor soil become stunted, and will not produce fine fruit. This is a fact that has been proven generations back, and I need not comment upon it. What the orange tree wants, and must have to yield a profitable return, is a deep, rich soil, gravelly or otherwise. Orange trees planted in a poor soil never become profitable bearers.

Distances to Plant.

Dwarfs, such as Tangerine, Satsuma, etc.	10 feet.
Semi-dwarfs, such as Washington Navel	
Mediterranean Sweet, Maltese Blood	
St. Michael	18 to 24 feet.
Standards, such as Wolfskill's Best, etc.	24 to 30 feet.
Seedlings	30 to 40 feet.

Number of Trees on an Acre When Planted.

	Square.	Quincunx.
Ten feet	426	831
Twelve feet	303	571
Fourteen feet	222	415
Sixteen feet	170	313
Eighteen feet	134	247
Twenty feet	109	199
Twenty-two feet	90	173
Twenty-four feet	76	137
Thirty feet	48	83

PLANTING SYSTEMS.

The methods most common in use are the Square and the Quincunx systems. The most adopted is the Square system, as the orchard can be changed to Quincunx after being planted, even after a number of years' growth. Two other systems are recommended for standard and dwarf trees. In order that they be better understood the illustration is given, showing the rows of the standard trees and the rows of dwarf trees by themselves. The distances given need not be adopted, but may be changed to any which may best suit the planter. However, the distances recommended are such as generally have been adopted.

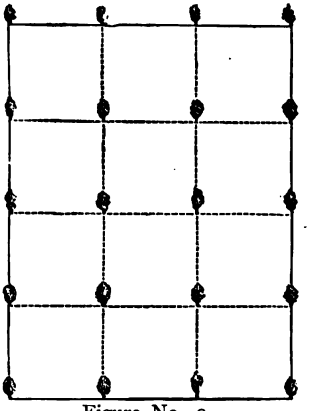

Figure No. 9.

THE SQUARE SYSTEM.

This system is the most adopted by the fruit growers. In this the orchard is laid off in lines, crossing each other with equal intervals of space, and a tree is planted at each crossing of the lines. This system is much preferred to any other, because it can be changed to quincunx, by simply planting a tree in the center of every four.

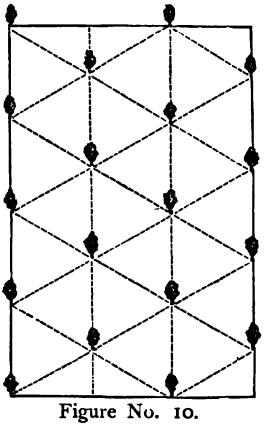

Figure No. 10.

QUINCUNX SYSTEM. (Fig. No. 10.)

(For Standard and Dwarf trees, also for Standard, or Dwarf trees set by themselves.)

The orchard is laid off in the same manner as for square planting, except that the number of rows is doubled. The standard trees are planted on the outside row, and the dwarf trees are planted in the center of every four standard trees (Fig. No. 9). If it is desired to increase the number of dwarf trees, then the outside row is planted with dwarf trees, and a standard tree is planted in the center of every four.

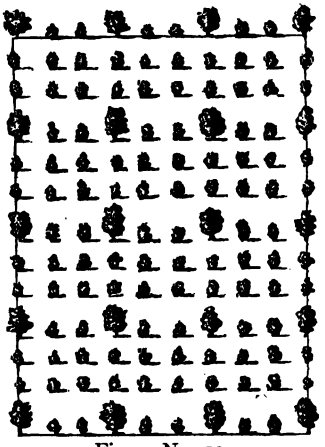

Figure No. 11.

TABLE OF DISTANCE:
0. 12 ft. X. 10 ft. X. 12 ft. 0.

DOUBLE SQUARE SYSTEM.
(Figure No. 11.)

Standard and Dwarf Trees.

Standard trees 34 feet apart each way; Dwarf trees 10 ft. and 12 ft. from the Standard trees.

This system is somewhat new in this State, but is coming into favor, especially by those setting out seedlings and varieties of home origin for Standard purposes. As the Standard trees do not come into bearing for several years, Dwarf trees are planted between, as they bear several crops before the others begin fruiting. They will also remain small, and will not interfere with the Standard orchard trees.

ANOTHER SQUARE SYSTEM.
(Figure No. 12.)

For Standard and Dwarf Trees.

This is exactly the same as the square system, only that the rows are doubled, Dwarf trees being planted in between the Standards.

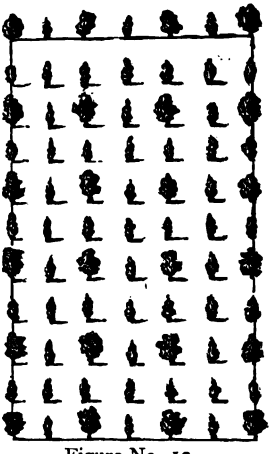

Figure No. 12.

EXTENDING THE ROOTS.

It is a common practice among growers to place the tree in the hole, fill it up with soil, and then tramp it. As the roots are covered with thick mud they will stick together, and if the tree grows it will not do as well as when the roots are extended with care. This is very simple. The hole is half filled with earth, so as to form a mound in the hole, the shovel handle is driven down in the center of the mound, and on being withdrawn a deep hole is left, sufficiently large and deep enough to admit the taproot of the tree, then the roots are spread over the mound (Figure No. 13), the soil is lightly pressed; heavy tramping is not necessary, as the

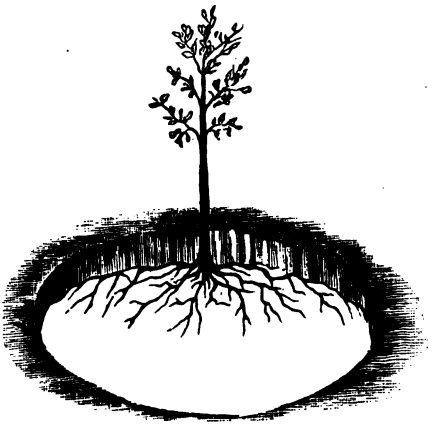

Figure No. 13.

water settles the dirt and keeps the roots in place. Soon after the trees have been watered, and as soon as the water in the basin has disappeared, the basin is covered with loose soil; this will protect the tree from getting dry and also from leaning over. Trees planted with these precautions make the best growth and become the thriftiest.

PRUNING.

When trees have been allowed to grow at will for several years before they are pruned, most of the inside brush will be found to be dead, and to remove it requires considerable work and skill, for if in removing a branch a hole is made that will allow the hot sun to enter, it will scorch the bark; the fine brush will also die, and diseased trees are sure to be the result. I have often read articles wherein the writers advocate, "that the trees be opened so as to allow plenty of air and sun-heat to enter." This advice comes from men having no practical knowledge; men who are ever willing to tell, but who cannot do it themselves. I am sure that no one having an orchard, depending upon that alone for a livelihood, would ever follow or give such advice. It is not practical and should be disregarded.

Figure No. 14 is a good illustration of how a tree is left, or what remains of it, after the brush that protects the trunk and branches is removed. The trunk and inside growth is left exposed to the sun's heat.

Figure No. 14.

I have often seen trees where the bark had been scorched and had dried on the south side of the tree, being the result of removing the brush that protected it.

Figure No. 15 illustrates a high trained tree of the same age.

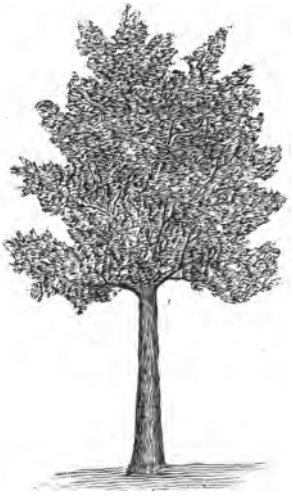

Figure No. 15.

In this the lower limbs have been removed, leaving a clear stock, so as to allow the horse in cultivating to pass under its branches, and the cultivator to work the ground close to the trunk.

Figure No. 16.

Figure No. 16 illustrates a low trained tree of the same age as Nos. 14 and 15. In this the lower limbs have been allowed to remain to protect its trunk and inner growth. The inside of the tree is kept clear of all dead wood, and no limbs have been allowed to cross each other, as when two limbs cross each other, if one of them is not removed, both limbs will be cut in two by the friction caused by the wind.

Advantage of Low Trained Trees.

There are several points that should be taken into consideration, *i. e.*: In summer the trees must be irrigated. If trained high the sun-heat will bake the ground under the trees before it can be worked; as the cultivator cannot run close to the trunk, it must therefore be worked by hand. When trees are trained low, the shade of the branches keeps the ground moist, and in case of the excessive heat, or scarcity of water through the summer, the trees will not suffer; whereas the heat causes the leaves of high trained trees to curl, and if not watered at the proper time, the growth of the fruit is checked. Low trained trees become better balanced, vigorous, healthy, and more productive than when trained high, also become straighter, and the fruit is much more easily and cheaply gathered.

Gum Disease.

This disease is first detected close to the ground, and also upon the trunk of the tree, and also on the limbs. It is a yellow gum which forms on the outside of the bark. It is an exudation of the sap of the tree which breaks through the bark and forms a gum. For several years various remedies were tried, but none proved effectual, for how could they; for the disease was not on the outside of the bark, as many did suppose, because they saw the gum running down the trunk. The disease is under the bark, and also will be found to have entered the inner bark, and in bad cases deep into the wood.

Remedy.

Cut away the bark surrounding the place from where the gum is oozing. When this is done, it can be detected where the main affected parts are. Then cut into the wood with a half-moon chisel or gouge, until all the parts from where the gum is oozing is removed; then leave it stand for a couple of days; then, if on examination it is found that the gum is still running, cut away more of the wood, until every particle of the disease is taken out. (Generally, if any is left, yellow streaks are seen in the grain of the wood, which are traces of it.) Then leave it alone for one or two days. If, on examination the second day, no more gum is seen, or any trace of it whatever, then it is a sign that all of it has been taken out. The wound must then be covered with some substance, so as to not allow the action of the atmosphere from cracking the wood left exposed, as it may injure the tree. If the disease has gone clean around the tree, then it is too far gone, and there is no cure for it. In such cases it is better to remove the tree and place a healthy one in its place.

Covering the Wound.

The simplest of all substances is rubber paint, manufactured by the Pacific Rubber Paint Company, at San Francisco. At least two coats should be given it. This will prevent the wound from cracking, and help it to heal.

Diseased Chips and Scrapings.

They must be put into a can as soon as taken from the tree and burned. They should not be left on the ground, as in irrigating the water will take them to healthy trees, and as the substance is gummy, and as the germ of the disease is not dead, will stick to the bodies of healthy trees, and the germ will grow, and will cause serious trouble.

The Cause of Gum Disease.

Many claim that it is not a disease, but that it is only caused by too much irrigation and neglect of cultivation at the proper time. While this is partly true, it is a disease produced not alone by excessive irrigation, but also by the tree being struck with the hoe in cultivating, or by the cultivator or plow. I have also seen the gum flow from the bark, caused by the hames of the harness of the horse rubbing in cultivating; also where trees had been shot by hunters, and by being hit with rocks by boys while trying to knock oranges off the trees. Therefore it must be seen how much a tree needs to be protected by the cultivator as well as from intruders into the orchard, for often the gum oozes from having a limb broken by persons who, in picking an orange, care little for the tree as long as they get the orange upon it. Other diseases, such as Die Back, Rust, Root Rot, etc., are not known in California.

Cutting the Tops of Gum Diseased Trees.

Many have been led to believe that when badly diseased trees begin to show signs of decay that they can be restored to perfect health by simply removing all the limbs, to force them to make new growth. The trees, of course, put forth, and the new shoots will bear fruit until life still remains in the tree, for generally there are a few healthy roots that keep the trees alive. But such trees will never be of any value, and what fruit they will bear will be very coarse, and much inferior to that once borne by them. They generally remain green for a long time, but such trees cannot come to life again.

BOLTING SPLIT LIMBS.

When trees grow with limbs forming a fork, they generally split in the center, caused by the heavy burden upon them. As soon as they are discovered, "that is, before they break down," they should be bolted together. (Figure No. 17.) If the limbs fall upon the ground they must be cut back considerably, to lessen their weight. They are then lifted up and a

Figure No. 17.

bolt passed through them. A large washer should be placed at each end. The bark in time will grow over the bolt. In this way valuable trees are often saved. The bolt should be of galvanized iron or steel. Wrought iron should not be used, as it will corrode too fast, and may cause the loss of the tree.

FERTILIZATION.

MR. A. SCOTT CHAPMAN, of San Gabriel, who has had perhaps more experience with fertilizers in this State than any other person, has this to say on the subject:

Plants feed on the same elements, but in varying proportions. Among the most important may be mentioned phosphoric acid, potash, lime, magnesia, and nitrogen, which are found only in small available quantities in the soil, although they may exist in large quantities in an unavailable condition.

According to Professor Johnson, "from 95 to 99 per cent of the entire mass (weight) of agricultural plants is derived directly or indirectly from the atmosphere. And from the atmosphere the crop can derive no appreciable quantity of those elements that are found in the ash."

To the soil, therefore, must we look for our supply of plant food, by rendering available the inert material, and when that quantity is too feeble to supply artificially what it may be deficient in.

The soils of Southern California are generally deficient in phosphates, a most necessary constituent of plant food, and generally the first to become exhausted. They are, as a general thing, rich in potash, and nitric acid, the conveyor of nitrogen to the plant, depends greatly on ourselves, nitrates being formed by the oxidation of ammonia in the soil, derived from the slow decay of organic matter in the soil, and proceeds most rapidly at a temperature of 70° to 80° F., which accounts for an abundance of acid in the summer, and a lack of same in early spring. The formation of nitrate of potash is a most interesting study to the farmer. Only within the past few years has it been discovered that the nitrate is formed through a fermentation produced by bacteria in the presence of humus, lime, and potash.

The carbon of the plant is derived through the leaf from the carbonic acid of the atmosphere; therefore may weeds become beneficial to the soil. By being matured and plowed under they keep the soil in a fine mechanical condition, retentive of moisture. They supply nitrogenous material for oxidation into nitric acid. They supply the water of the soil with carbonic acid, which has a "high solvent power on the carbonates of lime, magnesia, protoxide of iron, and protoxide of manganese. When carbonated water comes into contact with siliceous minerals they are decomposed much more rapidly than by pure water."

The general mode of fertilizing in this country seems to be principally tillage, with an occasional dressing of some manure once every two or three years, and copious irrigation. Now, it would seem that this constant irrigation with pure water, as it is in the San Gabriel Valley, would wash from the soil its soluble salts, not only depriving it of them, but to an extent leaching and making the soil less subject to hydroscopic water. And again, when thorough tillage is resorted to, to the exclusion of manure, it stimulates the soil beyond the powers of endurance, the vegetable mold is rapidly used up, the available phosphoric acid reverts to an insoluble condition, and the soil thus left in its primary condition is subject to bake and form hardpan. And again, where heavy manuring is resorted to, say once in three years, as is sometimes done here, then do parts of the plant food revert to an inert form, and the great quantity of organic matter becomes acid, and sours the soil unless it be an exceedingly calcareous one.

On my father's place, at San Gabriel, we choose to manure lightly and often, by shoveling sheep manure into the irrigating ditches, allowing each tree to receive about twenty-five pounds at each separate irrigation. Our basins cover the entire surface of the ground. We make no effort to choke such weeds as clover, alfilerilla, and the like; but the irrigator with his hoe destroys the obnoxious nightshade, hoarhound, and nettle.

In the fall of the year we follow with a copious liming—about three barrels of unslacked lime to the acre—applied in the following manner at the head of our irrigating ditch: We plant a box about three feet wide, six feet long, two feet deep, and six inches under the surface of the running water. In it we place a barrel of the lime. It slacks and swells to twice its original bulk. A man stands on this with his hoe, and sees that the water carries it off evenly. With an irrigating head such as we use a man will run into the ditch four barrels a day, or about three barrels to the acre. We now leave the orange orchard till spring, when we

plow under weeds, manure, and lime. We thus aim to supply our soil with nitrate of lime, potash, and magnesia. Carbonic acid gas is absorbed by the water, and attacks the inert plant food in the soil. Hardpan is prevented, both by the mechanical effects of the vegetable matter and the lime.

The present outlook for the crop in the southern part of this State is not large; but the fruit is of larger size and better quality. But in those particular places which have been called to my notice, where they have fertilized, the crop is heavy. Peculiarly is it so in Riverside, where these people deal in corners in sheep manure and commercial fertilizers. The effect of the fertilizers on the Australian Navel in our orchard is very marked, for it generally happens that there are on this tree a great many oranges that do not develop the proper characteristic. This year the stamp of the fertilizer is plain.

"We have walnut trees on our place at San Gabriel that we have not plowed for two years; but we have thoroughly fertilized them, and never before did they bear as many and good a crop as this fall, and I may say the same of our lemons. And again, we have a particular plot of about five acres in our orchard where we have not allowed a weed to grow, cultivating after each irrigation; but this orchard was fertilized with sheep manure at each irrigation, and limed last winter at the rate of ten barrels to the acre. These trees will average twelve feet in diameter and fifteen feet in height. They are literally covered with fruit, and will average six boxes to the tree.

USES TO WHICH THE ORANGE MAY BE PUT.

ORANGE WINE.—Take one part orange juice, well strained; one part water; three pounds sugar per gallon. Any kind of sugar will do, and the darker the sugar the richer will be the color of the wine. For each ten gallons put up keep about one gallon of the same for refilling the casks during fermentation. Lay casks on the side, fill full, and leave bung open. Do not let it be exposed to much cold. Fill up the casks every day, from the quantity kept out, as the scum is thrown off, and watch closely until the wine passes through the stage of alcoholic fermentation. This will usually require from ten to twenty days, or longer if the weather is cool, and can easily be determined by scum ceasing to rise, and the cessation of brisk fermentation. When it arrives at this stage, place the bung in loosely. Watch closely for a few days, and as active fermentation ceases, put the bung in fast. Let it stand two months, then rack off carefully into clean casks. If perfectly clear, seal and let it stand six months, when it may be bottled. If not clear, it should be racked off a second time in two months after the first time, and sealed for six months before bottling. Be sure your casks are full, for contact with the air

will cause the wine to pass into acetic fermentation. Considerable wine from oranges has been manufactured in Florida, and the demand for it has been very good at $5 per gallon. The wine continues to improve with age.

ORANGE CUSTARD is very nice made in the usual way, using the juice of one large orange to each pint of milk.

ORANGE ICING is made by adding to the eggs and sugar the juice and grated rind of the orange.

ORANGE CAKE is made by adding the juice and grated rind to the other ingredients. Layer cake is made by beating eggs and sugar together, as for frosting, and adding the juice and grated rind of the orange, and spreading between the layers.

ORANGE PUDDING.—Four large oranges. Peel and cut into pieces. Add one cup of sugar, and let it stand. Take one cup of nearly boiling milk, and stir into it four tablespoonfuls of corn starch, mixed with a little water and yolks of four eggs. When done let it cool, and then mix with the orange. Use the whites of two eggs with one cup of sugar for frosting. Spread over the top, and place it in oven until brown.

RICH ORANGEADE.—Steep the yellow rinds of six sweet and two bitter-sweet oranges in a quart of boiling water; closely cover for four or five hours. Make a syrup with a pound of sugar and three pints of water. Mix the infusion and syrup together. Press in the juice of a dozen sweet oranges and two bitter-sweet, from which the rind has been taken. Stir thoroughly, and run through a jelly bag. Seal hot to keep for use.

ORANGE SOUFFLE.—Make a soft custard of one pint of milk and the yolks of five eggs. Take two large oranges. Grate the rind of one of them. Pare and slice them thin, and put with the grated rind in a dish. Pour the custard over them. Beat the whites of the eggs stiff, sweeten them well, and flavor slightly with vanilla. Put this on top of the custard, smoothing it over with a knife. Put the dish in a pan filled with hot water, and set in the oven to brown.

ORANGE MARMALADE.—To three pounds of oranges allow three pounds of sugar. Wash and brush the fruit. Put on

the stove in boiling water, just sufficient to cover them, and boil until quite tender. Cut the fruit in halves. Scoop out the middle with a spoon. Pinch out the seed and white skin. Cut the rinds into chips. Take a pint of the first water the oranges were boiled in; add to it the sugar, chips, and pulp, and after it comes to a boil let it simmer until clear. To every dozen oranges add the juice of three lemons.

ORANGE JELLY.—Take five oranges and one lemon. Take rind off two of the oranges and half of the lemon. Put them in a basin, after removing the pith, and squeeze the juice of the fruit into it. Then put four ounces of sugar into a stew-pan with half a pint of water. Add the juice and peel, and set the mixture on to boil. Then put in one and a half ounces of isinglass or gelatine and a gill of water. Let it boil for a few minutes, stirring it well, and pass it through a fine sieve or jelly bag into a mould. A few drops of cochineal may be added to give it an orange tint. This jelly does not require to look clear.

PART II.

VARIETIES, CURING, SHIPPING, BUDDING, ETC.

CITRUS MEDICA LIMONIUM.
CITRUS MEDICA LIMON FRUCTU CITRATO.
CITRUS CITRATA SCABIOSA ET MONSTRUSOSA.
CITRUS LIMONIA DULCIS.

THE LEMON.

CHAPTER XII.

BEST VARIETIES TO PLANT, ETC.

CLASS A.

There is no fruit that has a more promising future in this State than the lemon. It is a tree that fruits well, blooms all the year round, and is ripening its fruit in every month of the year. The best varieties should only be planted—such as will undergo the curing process.

A marketable lemon should not be large, but of medium size, sweet rind, and strong acid.

The common seedling lemon does not pay to grow; its keeping qualities are very poor; if put to curing, as soon as it leaves the process will be found to be worthless, as almost every lemon will show signs of decay. Therefore it cannot be expected that lemons of inferior quality will pay their culture.

The varieties described under this head are of foreign origin, and are recommended (excepting the sweet lemon) as being marketable, prolific bearers, good keepers, and such as the fruit growers should plant for profit.

LISBON.

Imported from Portugal. Fruit is of medium size, fine grain, sweet rind, and very strong acid; very few seeds. The fruit grows very uniform on the tree, a good keeper, and a prolific bearer. Lemons can be picked from the tree at any time of the year.

The tree is a strong grower, and makes a larger tree than the other varieties described under this head. Is quite thorny,

but thorns decrease in size as the tree grows older. A very desirable variety.

VILLA FRANCA.

Imported from Europe. Is of a medium size, considered to be the finest of all lemons grown. This lemon has fruited in Los Angeles for several years in the orchard of J. W. Wolfskill. Fruit oblong, slightly pointed at the blossom end, rind thin, without any trace of bitterness, even when green, acid strong, juicy, nearly seedless. Tree thornless, branches spreading and somewhat drooping, foliage sufficiently abundant to prevent the fruit from scorching. This variety has the name of withstanding a lower temperature than other imported varieties.

GENOA.

Imported from Genoa by Don Jose Rubio, of Los Angeles. Medium size, oval, sweet rind, thornless, and nearly seedless. Tree is of a dwarf habit, a good keeper, one of the best.

ASIATIC.

Imported by J. W. Wolfskill, of Los Angeles. Fruit medium size, oval, thin rind, without any trace of bitterness under the most careful tests. Tree and fruit resemble the Genoa, but a better acid, thornless.

SICILY.

This lemon was about the first cultivated in California. Since then many other varieties have been introduced which are far its superior. However, if put through the proper treatment will produce a good lemon.

SWEET LEMON (Sweet Lime, Lima).

This variety was cultivated by the early settlers; it must, therefore, have been introduced by them from the seed or cutting. The fruit is different from all other citrus fruits. It is not like an orange, resembling the lemon. General Vallejo says "that he remembers having eaten this fruit at Monterey in 1822, and that he saw trees that same year growing at the San Gabriel Mission." The fruit is very sweet, although the pulp is very coarse, is esteemed by many, especially for its sweet scent, but the demand for it is very limited.

CHAPTER XIII.

BEST VARIETIES OF CALIFORNIA ORIGIN.

CLASS B.

EUREKA.

A native of California, originated by C. R. Workman at Los Angeles, from seed imported from Hamburg in 1872, only one seed growing, from which buds were put by him on orange stock. Introduced to the public by T. A. Garey, of Los Angeles. Fruit medium size, sweet rind, a good keeper, considered by many to be the best, but the drawback it has is the leaves are inclined to curl, scarce foliage, fruit produced at extremities of branches and liable to get sunburnt; does better when grown on large seedling orange stock; the tree is thornless.

AGNES.

Originated at National City by Mr. Frank A. Kimball. This lemon is of superior quality, medium size, sweet rind, pulp very fine, with strong acid and very few seeds; thorns few, short and blunt, is a rapid grower, but drooping in character; medium dwarf. This lemon has fruited for six years with Mr. Kimball, and has proved itself to be a good keeper and a very desirable variety.

OLIVIA.

Originated by George C. Swan at San Diego. Fruit of medium size, and said to be of excellent quality; strong acid, and a good bearer; thorny.

GARCELON'S KNOBBY.

Originated by G. W. Garcelon at Riverside. The fruit is of medium size; when cured very thin rind, juicy, and the tests have found it to contain more citric acid to its size than other lemons.

CHAPTER XIV.

MISCELLANEOUS VARIETIES.

CLASS C.

The varieties under this head are of no practical value, rendered so by the bitterness of the rind, and bitter acid. They should be discarded.

CALIFORNIA SICILY.

This name has been given to the common Seedling Lemon.

BOUTON.

Originated by General Bouton, at Los Angeles. A vigorous grower; sweet rind, when cured, but tree very thorny; fruit full of seeds; a poor keeper.

BONNIE BRAE. (Higgins Lemon.)

Originated by H. M. Higgins, of San Diego. A vigorous grower; tree thorny. The foliage is different from any other lemon, resembling the foliage of the Chinese Lemon. Size medium; rind thin, bitter. Fruit ribbed, somewhat like the Muskmelon.

SWEET RIND.

A California seedling. Fruit very large; tree very thorny; inferior.

CHINESE LEMON.

This variety was extensively cultivated in California as a stock for budding the orange upon. This practice was soon abandoned, for it was found by practical experience that the fruit grown upon it was very coarse and sour, which rendered it unmarketable. The root begins to decay about the second or third year after the buds begin fruiting. The root is not strong enough to hold the weight of the top made by the orange bud, and, being brittle, the trees are blown down by the wind. The fruit is used for preserving purposes, similar to the citron. In California it has never come into favor. The tree is a dwarf. It fruits all the year round.

CHAPTER XV.

VARIETIES GROWN IN FOREIGN COUNTRIES AND IN FLORIDA.

CLASS D.

The varieties under this class, marked with an asterisk (*), are grown in Florida, and are considered of great value there. The others on the list are grown in foreign countries; and it is not known if any of them have as yet been introduced either into Florida or California.

* EVER-BEARING.

Fruit large and coarse. Decreases in size as the tree grows older.

* LAMB.

Fruit medium. Strong acid. Said to be a good lemon.

* BIJOU.

Claimed to be a remarkable lemon, ripening much earlier than others.

* VARIEGATED.

The leaves are mottled with white. Very ornamental.

* NAPOLEON.

Said to be a good shipping lemon. Thin rind; oblong shape, of medium size. A prolific bearer.

* AUGUST.

Generally ripening in August. The tree is a rapid and vigorous grower. A good shipper. Has a smooth skin, and elongated in shape.

* BELAIR–PREMIUM.

This variety is considered to be one of the best. The tree is strong and thrifty. Fruit of a medium size, and without bitterness.

* FRENCH'S SEEDLING.

This tree is a strong grower. Almost thornless. Fruit quite small.

* *Valentina.*
* *Leghorn.*
* *Neapolitana.*
* *Makay* (Florida origin).
* *Miranda* (Florida origin).
* *Lemonia Trifoliata* (dwarf, ornamental only).
* *Variegated* (ornamental only).
* *Belair* (Florida origin).
* *Limonium Trifoliatum* (a hardy species of lemon, fruit the size of a lime; edible).
* *Malta.*
* *Waring's Seedling* (Florida origin).
* *French or Florida* (used for stock).

ITALY.

Genoese (said to stand the longest transportation).
Garden Lemon (inferior).
Bergamot (cultivated for the essence only).
Neapolitan (a greenish fruit, said to be good).
Mela Rosa (a small ribbed lemon).
Paradise (fruit very large, used for confectionery).
Limonum Tenno (too tender for transportation).
Limonum Oblongum (considered very good, but coarse).
Citrus Limo (valued for its medical virtues).
Cummunis.
Suacco.

SPAIN.

Castilian (prolific).
Royal (very large).

TURKEY.

Canadian.
Chio.
Paros.
Messina.
Sweet Lemon (citrus lumia).

MOROCCO.

Roman,
Melaroce.
St. Jerome.

CHAPTER XVI.

LEMONS. (From seed.)

Lemons grown in California from seed generally produce poor fruit, with a bitter rind, and very poor keeping qualities. The fruit is generally very large, quite puffy rind, which destroys their commercial value.

LEMON STOCK. (From seed.)

Lemon stock grown from seed make better trees than those propagated by cuttings. The roots are healthier; but as the lemon stock is subject to the deadly Gum disease it has been discarded, and is not recommended. About the time the trees come into bearing the roots will begin to show signs of disease. This trouble will continue until the tree dies or is removed.

This Gum disease will appear sooner on trees planted on heavy or adobe soil, or on soil that requires irrigation in the summer. It is claimed by some that if the trees are planted on dry, sandy soil, or on sidehills, where there is considerable drainage, that the Gum will not make its appearance. That is partly true. The tree will be less subject to the disease; but I have seen many trees on sandy, dry ground as badly affected with the Gum disease as those planted on heavy bottom land.

FROM CUTTINGS.

The lemon grows readily from the cutting. The cuttings can be planted in the spring and through the summer. The smaller the cutting the better, but not too small, as in a very short time the wound made by the cut at the end of the cut-

ting will grow over, and make healthy roots, and produce a better tree than the large cuttings.

What to Bud the Lemon On.

It has been claimed that if the lemon be budded on anything but lemon stock, that the lemons will lose their elongated shape, and that they will become roundish, especially if budded on the orange.

I have often observed roundish lemons on trees budded on orange stock, but they are so few that it is hardly noticeable.

One fact must be borne in mind, and that is that the orange is less susceptible to Gum disease, and that it is hardier, and more able to support the heavy weight of the fruit and foliage; and also, that lemons budded on orange stock never blow over; and another fact that cannot be contradicted is, that the quality of the lemon grown on orange stock cannot be surpassed.

CHAPTER XVII.

LEMON CURING, PACKING, ETC.

SIZES TO PACK.

If possible pack only the following numbers in each box, which are the standard sizes, viz.: two hundred and fifty, three hundred, and three hundred and fifty.

SHIPPING.

After being neatly packed, and the covers carefully nailed on, they are ready for shipment, but in no case should the box be allowed to stand exposed to the sun for hours in the wagon in which they are hauled from the orchard to the cars or depot. The load should be covered with a thick canvas to protect the fruit from the sun's heat. While in transit, all these precautions are very necessary, as much fruit is often ruined lying in the strong sunshine at the depot, or on board of the wagons, awaiting transit to cars.

LEMON CURING.

Clip (stem cut, do not pull) the lemons when fully grown and beginning to show a faint sign of golden color. If cut too soon, it will injure the flavor and reduce the amount of juice, which is the certain effect if picked before mature.

LAYING THEM ON THE GROUND.

As soon as clipped lay them on the ground under the tree, where not a ray of sunshine can fall upon them, as that would make them spotted. It is not necessary to put any covering

over them unless the trees are pruned high. That would allow the sun to strike direct on them. In such a case it is well to place some loose straw over them. Let them lay on the ground a week or ten days, the weather permitting. They should not be handled until they have shriveled enough to allow handling. Then take them and on the floor of a close room pile the lemons in large heaps, and cover them with gunny sacks or blankets, shut the door, and let them remain forty-eight hours, then wipe them carefully, for they will be covered with moisture, and put them into boxes, filling them only half full, and pile the boxes one above the other in the room, and be careful not to let a current of air pass through the room; the doors should be shut until the lemons are perfectly dry, which will be in three or four days; then carefully size them, and leave out all imperfect fruit, as it injures the sale of the good fruit. Then wrap them in tissue paper, and pack them very tightly in boxes, marking number of lemons and brand on each box. In picking it is best to use baskets, and the fruit will not get pricked with the thorns.

Another Process Recommended.

Mr. A. Scott Chapman, of San Gabriel, has met with very good success in curing lemons. His process is very simple: The fruit is gathered green, just when turning to yellow, and of such a size that, allowing for shrinkage, will pack from two hundred and fifty to three hundred and fifty in a box. The man gathering has his sack suspended across his shoulders, takes hold of the lemon with his left hand, and with his right clips the stem with a clipper close to the calyx of the fruit. In case he should drop one he is not allowed to pick it up, for that lemon is liable to rot. He carefully places them in his sack, and having half filled the same, places them one by one in a tray. The trays are placed one above another in the shade of the tree (the trays are six inches deep, filled four inches deep with lemons); there they are allowed to remain for one week, the weather permitting. They will then bear the jar of transporting them to the packing house. At the packing house the trays are placed one above another, about six trays high; a

layer of old newspapers is placed on the topmost trays, to keep the lemons therein from drying too fast and getting dusty. At the end of another week, if the weather has not been damp, they will be ready for packing, being yielding and leathery to the touch; they will also have turned yellow. Then they are assorted into sizes and packed; only those of the same size are packed in the boxes by themselves.

SULPHURING THE LEMON.

Bleaching the lemon with sulphur fumes was extensively experimented with. It had been claimed that fruit treated in this way would keep an indefinite time, as the sulphurous gas would toughen the skin and dry up the watery particles, and that it would kill the fungoids on the fruit. Lemons treated in this way did not prove thus. As soon as they left the treating rooms they were noticed to be spotted, and by the excessive use of sulphur some would be rendered white, while others would still retain part of their color on one side, while the other would be bleached to an unnatural color. This has been abandoned.

CURING COMMON SEEDLINGS.

Three years ago a grower at San Gabriel, having an orchard of one hundred and fifty large Seedling trees, experimented for the purpose of testing their keeping qualities. He went about it in a practical way: The fruit was stem cut with great care, and laid carefully on straw under the trees away from the direct rays of the sun. When they had shriveled enough to allow handling, they were wiped dry and put into boxes, filling them one half full, and put into the packing house. About three weeks after they were repacked, and all decayed lemons found therein (about 50 per cent) thrown away; nothing but apparently sound fruit was packed, and each one carefully wrapped in tissue paper. Out of about one hundred boxes picked, only fifty-two were shipped. They were shipped to San Francisco, being on the way four days. Upon arrival it was noticed that many were decaying. In order to be sold they had to compete with well-cured lemons, as the market was

well supplied at the time. They had to remain in the warehouse, as buyers would not take them at any price. Only a few boxes were sold. The grower, after waiting patiently for his returns, was surprised on receiving a letter from the dealer, in which he was informed that he was indebted in the sum of 75 cents balance for freight on the lot.

BUDDING THE TREES.

After going through this sad experience, the grower asked my advice in the matter. I recommended that they should be budded into a good marketable variety. The question was then (the trees are very large—buds will not take in the old wood), how will you do it?

HOW IT WAS DONE.

In the early spring, as soon as the trees show signs of growing, I cut the main branches (some as thick as six inches through), within two or three feet to the crutch of the tree—all lower also several other branches were allowed to grow. For if all the foliage of the tree is removed, the shock is so great that the tree seldom recovers its vigor. The trunk will sunburn, and in many instances the trees have been lost. Very soon after numerous shoots began to put forth at the end of every limb that was cut; and when about four to six inches, only those intended to remain were left. All others were removed. When these shoots had attained a large enough size the large branches which had been left were all removed, and the sap forced into the young shoots. The fine branches around the trunk, however, were allowed to remain, to prevent the hot sun through the summer from scorching the bark. The new shoots were then very strong and thrifty, many being two inches in diameter. In the fall they were budded with the Eureka lemon, and the buds allowed to remain dormant through the winter. In the following spring all this brush was removed, and all cuts made were covered with two coats of rubber paint. The dormant buds came out beautifully. Very few of the tops of the shoots were required to be re-

moved to start the buds. One half of the top of the shoot was only removed in order to force them. As soon as the bud was able to support itself the whole top of the shoots was removed to within about eight inches above the bud, and the buds that had started were tied to what remained of the shoot. The body of the tree was kept clear of all suckers or sprouts. At first the suckering was considerable, as in the warm weather, and after each irrigation, and as the buds were not able to take up the entire sap flowing up a large trunk, it caused the sprouts to come out all over the tree; but when the buds were large enough to shade the trunk this ceased. Those buds are now nearly three years old; are very large. Many lemons are now on them, and the old worthless seedlings are no more, but in their stead a beautiful and thrifty Eureka lemon orchard.

USES TO WHICH LEMONS MAY BE PUT.

LEMON BISCUIT.—One and one half cups of sugar, one cup of butter, four eggs, one and one half pints of flour, one teaspoonful of extract of lemon. Mix the butter, sugar, and beaten eggs together, add the flour sifted with two teaspoonfuls of baking powder; flour the board, and roll out the dough one fourth of an inch thick; cut out and lay on a greased tin; wash over with milk, and lay a thin slice of citron on each. Bake in a hot oven ten minutes.

LEMON CREAMS.—Pare two lemons thin, pour over one half pint of boiling water, and let stand all night. Squeeze the juice of the lemons on one half pound of sugar next morning; beat three eggs well; take out the peel, and mix the water with other ingredients; strain through a sieve; then stir over a brisk fire till thick as cream; pour hot in the glasses.

LEMON CAKE.—One cup fresh butter, three cups pulverized sugar; rub to a cream; stir in the yolks of five eggs well beaten, one cup sweet milk, one teaspoonful soda, juice and grated peel of a fresh lemon, the whites of five eggs, four cups sifted flour, one teaspoonful cream tartar. Bake in round or square pans with straight sides.

LEMON PIE.—One teacup of boiling water, two tablespoonfuls of cornstarch, cooking until a thick paste; add one cup of sugar, piece of butter the size of an egg, and set to cool; stir together the yolks of two eggs and the grated rind and juice of one lemon; mix all together; bake quickly; frost when done.

LEMON DROPS.—Dissolve half a pound pulverized sugar in lemon juice and boil to a thin syrup. Drop on plates and harden in a warm place.

PRESERVED LEMON PEEL.—Make a thick syrup of white sugar; chop the lemon peel fine, and boil it in the syrup ten minutes; put in glass tumblers and paste paper over. A teaspoonful of this makes a loaf of cake or dish of sauce very nice.

PART III.

VARIETIES HABITS, STOCK ETC.

CITRUS MEDICA LIMETTA.

THE LIME.

CHAPTER XVIII.

Lime Culture.

The culture of the lime has not been a success in California, as it is the most tender and more susceptible to frosts than any other tree of the citrus family. It can only be grown successfully in warm belts and sheltered localities. The cultivation of the tree is very simple. The plants are raised from seed without any difficulty. It comes true from seed; only in exceptional cases does the seed "sport."

It has been asserted that the orange budded on lime stock becomes hardier, and that in this way they escape all pests. This is not true. Scale and other pests infest the lime as well as other citrus trees, and for this and other reasons lime growing in California is rendered unprofitable.

Lime Stock.

Lime stock has been used considerably for budding the orange upon. The fruit produced on the lime stock is coarse and large, and for this reason it has been entirely discarded as a stock for the orange.

Imperial.

Imported by J. W. Wolfskill, of Los Angeles. This variety is the largest of all limes. The fruit is the size of the Genoa lemon.

The planting of this variety should be encouraged, as it is quite as hardy as the lemon; can, therefore, be planted where

the Mexican lime would be sure to fail. The tree is very productive, fruits all the year round, and is less thorny than the Mexican lime.

I am convinced that this variety is a most valuable acquisition, because of its healthfulness, and its fruit of superior quality; that it will prove profitable to those who will propagate it.

MEXICAN.

This variety is principally grown in California. It is a choice lime, equal to the imported Mexican. The tree is much used for hedges, for which purpose it is well adapted.

TAHITI.

A much stronger grower, and fruit much larger than the Mexican, but coarse and of inferior quality.

OTHER VARIETIES.

Jewish Lime, imported (a small conical fruit).
Genoese Lime (very large, like a lemon).
Florentine (a hybrid, grown in Florida).
Moster Lime (fruit very large, like a lemon).
Salo Lime (a small round fruit).
Persian Lime (like Tahiti inferior).
Citronella Lime (very coarse, thick rind).
Florida Seedling (nearly as large as a lemon; quite coarse).
* *Valentine.*
* *Knatta.*
* *Kaghazin.*
* *Sour Turanj.*
* *Sour Raugpur.*
* *Sour Jamberi.*
* *Sadaphal.*

* Imported into Florida, and now commencing to fruit in that State.

PART IV.

HOW TO PREPARE, PROPAGATION, ETC.

CITRUS MEDICA CIDRA.

THE CITRON.

CHAPTER XIX.

CITRON CULTURE.

The citron has only been grown in California to a limited extent, the demand for it being very limited. It is only for its thick rind that the citron is valued. The candied citron in our markets is imported. The fruit raised in this State can be as well cured as the foreign grown. Those that have tried the experiment have produced a better and finer article than the imported.

LEMON, OR SORRENTO (Citron of Commerce).

Shape oblong like the lemon, with a very pleasant aroma, which is much esteemed; skin bright yellow, smooth and very glossy; inner skin white, coarse, and thick, with very little trace of bitterness. The fruit grows very large, weighing from three to five pounds each. The tree is of a dwarf habit, with large glossy leaves, and very ornamental. It grows from the cutting, and is also budded on orange, lime, and lemon stock. It comes true from seed.

HOW TO PREPARE CITRON.

The fruit, when bright yellow, is picked and placed in barrels filled with brine, and left for at least a month. The brine is renewed several times, and the fruit allowed to remain in it until required for use, often for a period of four or five months.

When the citrons are to be candied they are taken from the barrels and boiled in fresh water to soften them. They are then cut into pieces, the seed is removed, and the fruit is again immersed in cold water, soon becoming of a greenish color. After this it is placed in large earthen jars, covered with hot syrup, and allowed to stand about three weeks. During this time the strength of the syrup is gradually increased. The fruit is then put into boilers with crystallized sugar dissolved in a little water, and cooked; then allowed to cool, and boiled again until it will take up no more sugar. It is then dried and packed in wooden boxes.

CITRON CAKE.—Three cups of sugar, one of butter, one of sweet milk, four cups of flour, one half teaspoonful of soda, and one of cream of tartar. Cut up one half pound of citron fine and thin, and the whites of ten eggs; cream the butter and sugar; sift the flour and add gradually, then the citron; beat the eggs until stiff and add last; sift the cream of tartar in the flour, and dissolve the soda in a little tepid water; beat all thoroughly before stirring in the eggs.

BOOKS RECOMMENDED.

I have tried in every way to give all the information on the subject within my power, not theoretically, but practically, as I understand it, from experience obtained in the field.

Whatever I may have omitted may be found in the following works:

Orange Culture in California, by T. A. Garey.

The Orange in California, by William A. Spalding.

Hand Book of Orange Culture, by Rev. T. W. Moore.

A Treatise on the Culture of the Orange, by George W. Davis.

Orange Culture in New Zealand, by George E. Alderton.

Florida Fruits—How to Raise Them, by Helen Harcourt.

A Treatise on the Citrus Family, by George Gallesio.

Consular Reports. (Fruit culture in the several countries.)

Bulletin No. 41½ of the Department of Agriculture, June, 1884.

A REVISION.

I hope to revise this edition at an early date. In the meantime I would be glad to be informed of any error or omission that unintentionally I may have made.

CONCLUSION.

I regret exceedingly that I have not been able to visit the citrus orchards that in recent years have been planted in the northern and central part of the State.

I had the pleasure, however, of viewing (last year and this year) two exhibits from that section that were exceedingly fine. The fruit was large and bright, and entirely free from smut, but not ripe, as in December there are no ripe oranges in this State; but being highly colored, they reminded me of about fifteen or twenty years ago, when we gathered such fruit from our trees in Los Angeles, which was in those days sold to dealers at from $30 to $50 per thousand.

Such a thing as an orange box was then unknown to us. The fruit was gathered and piled into heaps; from these heaps they were counted and packed into whatever boxes the dealers could obtain. The fruit was very bright and large. Growers desiring to improve the quality of their fruits imported foreign varieties, and in so doing introduced many insect pests that were unknown to us, and which soon found a home in our groves. They were left to increase, as we did not know what they were, and their presence was only felt when our trees no longer produced the fine and large bright fruit once borne by them.

The utmost care should be exercised in taking nursery stock from infested localities to places not infested. To be safe no man should ever take a tree to his home except it be from districts entirely free from all insect pests.

If my investigations, and the task that I imposed upon myself in the preparation of these chapters, shall aid the progress of horticulture in this State, I am happy and satisfied.